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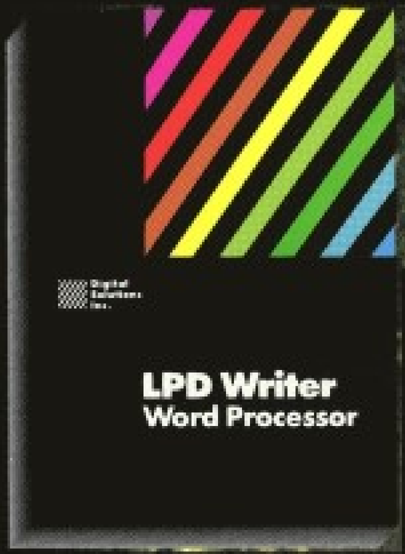
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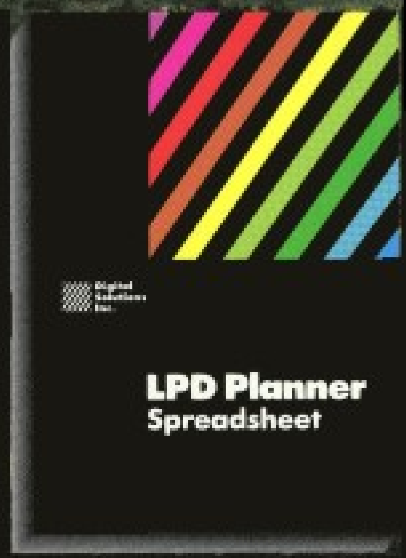
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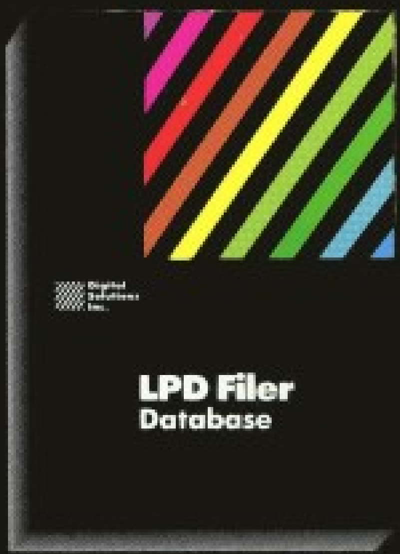
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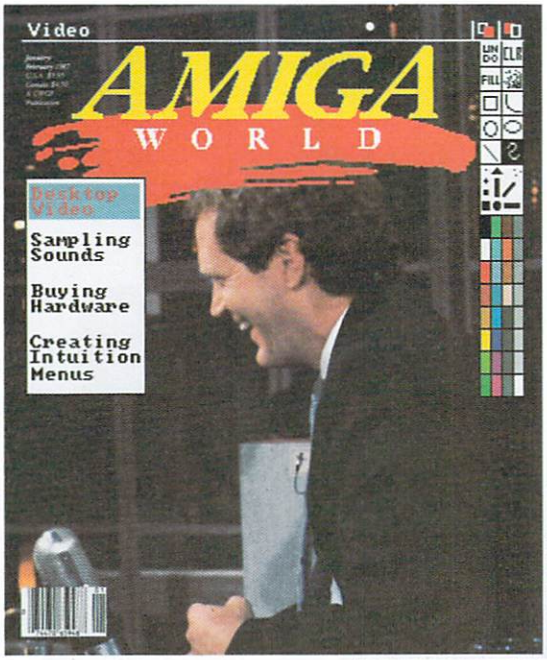
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Commodore's Amiga 1300 Genlock lets you overlay computer graphics on a video source: a powerful tool for Desktop Video. Cover graphics by Roger Goode; David Letterman video image courtesy of NBC, New York.

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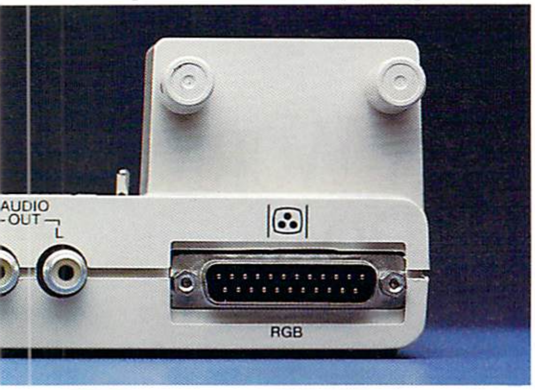
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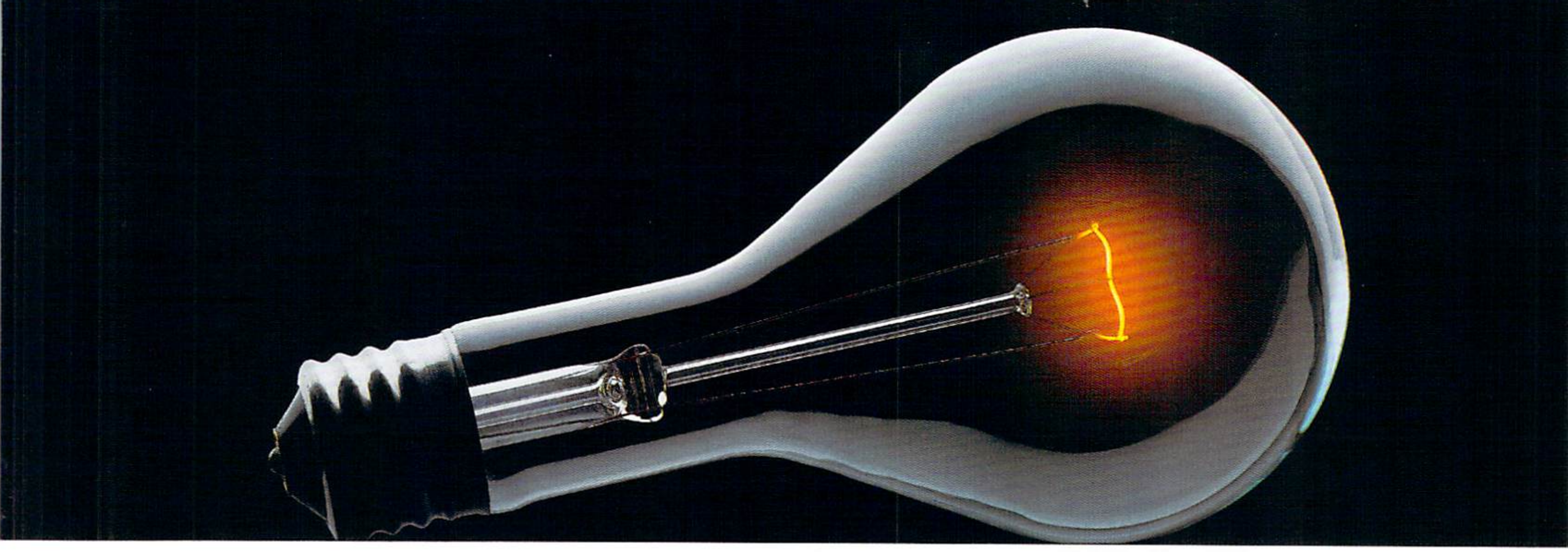
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JANUARY/FEBRUARY 1987

CONTENTS

VOLUME 3, NUMBER 1





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Zeitgeist

By Guy Wright

Zeitgeist'tsit-gist, 'zit- n, [*Old High German, from. zeit (time) + geist (ghost or spirit)*] *(1884): 1) The general intellectual, moral, and cultural climate of an era. 2) Words of dubious wisdom from the editor of* AmigaWorld.

Starting off the new year I thought that I would begin by explaining why, what and where *Zeitgeist* came from. I get asked about the title of my editorial page often. There are usually two kinds of questions: first (usually from European types), "Where did you come up with 'Zeitgeist?' It is such a perfect word"; and second, "I enjoy reading your column, and. . .by the way, what does 'Zeitgeist' mean?" I think the dictionary definition above nails it fairly well, but as it relates to this column, I use Zeitgeist to mean the current state of the Amiga, the magazine, Commodore and anything else that I can think of. And, well. . .read on.

Video is the topic of our feature article in this issue and I think we went a long way toward demystifying the new phenomenon of desktop video. With the thousands of VCRs and video cameras being sold, it seems natural that Amiga owners would start putting all this equipment together to come up with some very interesting results. If you have an Amiga and some kind of video equipment (or plan to buy a video camera or VCR), you will definitely want to read this issue carefully.

We are also finishing up the buyer's guide started in the last issue. (What? There's more?) In this issue you will find the first of our hardware buyer's guides. We plan to be continually updating both the hardware and the software buyer's guides from now on.

As far as the magazine is going, we are doing fine. All of you have helped make *AmigaWorld* the best publication for the Amiga owner. We wanted to go monthly with a March issue, but the economics just aren't there yet. Double your costs without doubling your income and you'll go broke pretty quickly. Since we aren't going to double your subscription price and we aren't going to charge the advertisers twice as much, we have to wait until there are enough advertisers willing to run adds 12 times a year rather than six. I think it will happen by the summer, but I have been wrong once or twice before.

Commodore seems to be doing better these days. They announced a profitable quarter. Sales of the Amiga, C-64 and 128 were good, and there has been talk about a new Amiga or two scheduled for release in early '87. We'll keep you informed about any new developments. The genlock was just about ready for shipping at the time of this writing (see the sidebar on page 19 for more about Genlock), and the Sidecar should be along any month now.

We have been getting a lot of positive feedback from you about the way that the magazine has been going for the past few issues, and we intend to keep doing things the way you want. As always, if there are things that you want to see in upcoming issues, let us know and we will try to get something in. And, as always, if you want to write something for us, we will welcome your input. (Send a SASE for a copy of our author's guidelines.)

Next issue, among other things, we will be looking at supercharged Amigas, for all of you hard-core hardware types. So, until then, stay tuned for the next episode of Zeitgeist.

Which brings me back to answering the first most asked question about the title of this column. The *real* reason I picked the word is that in 1968, Grove press published a tongue-in-cheek parody of cliff-hanger adventure comics that I thought was great. Written by Michael O'Donoghue and Frank Springer, it had the titillating title "The Adventures of Phoebe Zeit-Geist." It sits on my desk, along with my sword and battle axe. That's the truth folks.■

Buyer's Guide Update

In last issue's software buyer's guide, a few things mistakenly slipped by, and a few things we wish had, didn't. So here we are, cap in hand, to set the record straight.

The number we gave for ***Geodesic Publications***, makers of **Triclops Invasion**, was incorrect. Call them at 916/629-2514.

The address and phone we listed for ***Clockwork Computers***, makers of the **CCI Integrated Merchandiser System**, was incorrect; they can be reached at 4612 Holly Ridge Road, Rockville, MD 20853, 301/924-5509.

The address for ***Scientific Software***, makers of the Equation Plotter—now called **EQPLOT(1.1)**—was not in our companies list; the address is: PO Box 202, Rexford, NY 12148.

The address we printed for ***New Horizons Software*** was also incorrect; their address is PO Box 43167, Austin, TX 78745.

The price we listed for **Pro Video CGI** from ***JDK Images***, 2224 E. 86th St., Suite 14, Bloomington, MN 55420, was misleading; the price we gave ($1,500–$2,000) *included* the cost of an Amiga. The price of the Pro Video CGI software itself is $199.95.

One product we should have mentioned is the **Graphics Editors** from ***Scott Lamb***. The disk contains two sprite editors and one block graphics editor. Write to Scott Lamb, 205C Heights Lane, Fort Worth, TX 76112, or call 817/485-9179.

A file manager not mentioned in our Database list was **Foxfile** from ***Foxware***. Foxfile uses menus and key combinations, allows up to 50 fields, and will be around $50. Contact Foxware at 1554 Park Creek Lane, Atlanta, GA 30319, 404/885-8960.

An entertainment product we missed was **Quintette**, a game based on an ancient Chinese strategy game. It's available from ***Miles Computing***, 7741 Alabama Ave., Suite 2, Canoga Park, CA 91304, 818/341-1411.

The price we gave for the game **Chessmate**, from ***Dark Horse***, was incorrect; instead of $32.50 it is $29.95.

Metacomco's languages, **Cambridge Lisp** and **MCC Pascal**, though listed in Utilities/Languages under Commodore's heading, are available directly from Metacomco. The address we gave for Metacomco has changed; Metacomco's current address is 5353 #E Scotts Valley Drive, Scotts Valley, CA 95066, 800/252-6382.

BBS Boo-Boos

A few wrong numbers were printed in last issue's BBS directory. On page 20, the number for ***Micro Systems Software***'s BBS should have been **305/737-1590.** On page 22, the number listed for ***Micro-SysSof*** in Victoria, BC was also incorrect; we have been unable to get the correct number so far.□

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So being the clever people that they were, the ancient Chinese developed a game to pass the time and enrich the mind — a game we now call Quintette.

The premise is simple and easy to learn: align five stones in a row, or capture five pair of your opponent's. The strategies, however, are challenging and complex: will your adversary lure you into capturing yourself? Or will they go for broke, allowing you to snatch victory from defeat? The outcomes are infinite and the process thoroughly absorbing, as Quintette is playable in pairs, teams, or against the computer itself.

Since that day many thousands of years ago, Quintette has traveled 'round the globe, entertaining millions of people along the way. And now, thanks to Miles Computing, you can share the intrigue on modern man's most vivid game board, AMIGA.

We think Confucius would be proud.



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Repartee

Kudos

Please continue to publish articles like the one on astronomical drawing [Hagen, Sept./Oct. '86, p. 26]. The pictures were fantastic, and only serve to demonstrate further the immense graphics power we Amiga owners possess within our machines. Kudos to the author for his fine contribution to AmigaWorld.

Patrick W. Simmons
Whitby, Ontario, Canada

Two problems I had been having were accessing my printer and using library functions from Amiga Basic. Your article on "Using Libraries from Amiga Basic" [Sept./Oct. '86, p. 50] and the piece on printer commands (with the table) in the Help Key section were great. I felt like my subscription had already paid for itself. I feel the last two issues have been very good as more data and articles become available. My only suggestions are to keep up the tutorials on Amiga Basic, AmigaDOS, etc., and I do enjoy programs accompanying articles, such as those with your articles on sound in the July/August issue.

Earl Davis
Marion, OH

Developer's Dilemma

AmigaWorld, *why are you so naive? Giving an award to the Amiga Technical Reference Manuals is like giving an award to William Carlos Williams for writing concrete, concise, easy-to-understand and precisely detailed poems.*

Anyone unfortunate enough to purchase these nebulous monstrosities knows that in order to decipher the information as it is presented requires nothing less than round-the-clock studying and intelligence equal to or greater than that of a supernatural being.

The manuals are sloppy, and in many cases the information is sketchy, incomplete or just plain wrong. The program examples, what few there are, are totally worthless from a tutorial standpoint. The documentation accompanying these programs is so bad, it seems almost a cruel joke! To drive the point further home, even the Editor-in-Chief of AmigaWorld, *Guy Wright, admits that he could not progress beyond the second chapter of the ROM Kernel Manual.*

You mentioned that the manuals brought vital information to those without Developer Status. What I want to know is, how does one attain developer status? I'm sure it must be granted only after long periods of fasting, physical exertion, and finally, divine intervention.

John Bushakra
Isla Vista, CA

Anyone interested in obtaining developer status should call Commodore at 215-431-9180. The above description of the requirements for developer status is probably a bit exaggerated. Rumor has it that the fasting period is only three days, and divine intervention is optional.

—Editors

Oversight

I am writing in regards to the review of color printers in your Nov./Dec. issue [Kalisher, p. 30]. I was rather shocked when I turned to page 34 and saw a printout of a picture called "Merlin." The reason I was shocked is that this is my *picture. I was excited to see it in your magazine, but when I checked to see if my name was mentioned as the artist, to my dismay, it was not. The picture had my name on it originally, but this part was cropped out. Since I was not even given credit for the picture, I got rather upset. I don't know about the artists of the other pictures, but no credit was given to them either.*

I would like to know if this is standard practice or just an oversight.

Jeff White
Tampa, FL

Sorry! This was an oversight on our part. All of the artists should have been credited for their work. The pictures were cropped to show detail, not to eliminate the artist's names. Once again, please accept our apologies for this oversight.

—Editors

Transformer Rebuttal

The sharpness of tone used by authors Van Name and Catchings in their review of the Amiga Transformer [Sept./Oct. '86, p. 97] indicates that they were not aware of Speedy3, a speed-up program for the Transformer. It should have been available to the authors during their use of Transformer, as it was on several Amiga BBSs before last summer. They ought to use Transformer again with Speedy3 and offer a postscript to their review. For the occasional IBM program user who does not need IBM graphics display, the Transformer is a cost-effective choice. If and when I purchase a Sidecar, the Transformer drive will simply plug in the back, providing me with dual 5¼-inch drives, creating an IBM clone that is, except for size, better than the original IBM.

Bob Schaeffer
Anchorage, AK

Miami Vice Fans

When I got my September/October issue of AmigaWorld, *I saw your article about Amigas on* Miami Vice. *I was the Industrial Designer (product designer) of the Amiga. I was responsible for the aesthetics and mechanical design of the Amiga. After spending a grueling year on the R & D and manufacturing, it is this kind of recognition that makes it all worthwhile, not to mention having worked on the most fantastic computer ever designed. My wife and I are also ardent fans of* Miami Vice!

Howard W. Stolz
Soquel, CA

Assembler Solution

Concerning the letter entitled "Dismal Afternoon" in the July/August '86 Repartee, Mr. Carlisle has my sympathy. I too don't feel like buying another disk drive, and I share his enthusiasm for such creatures as the Mandelbrot set. Since my main interest in assembly-language programming is to speed up iterative portions of BASIC programs, a fairly primitive assembler meets my needs.

Solution: write one in BASIC. I did. It's not pretty, but it permits me to fill a screen with the Mandelbrot set in half an hour or so. If Mr. Carlisle or any of your other readers are interested, they are welcome to a copy. They can call me at (505) 522-6408 or write me at 2989 Sundance Circle, Las Cruces, NM 88001.

Martin F. Combs
Las Cruces, NM

Gentle Persuasion

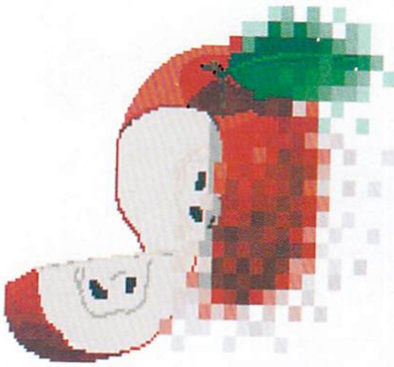
I just want to tell the cockeyed world that the Amiga is the best damn machine to come along this side of costing fifty really big ones, and you may inform the management of Commodore Business Machines, Inc. that if they discontinue the Amiga now, I will personally come down there and beat the crap out of each and every one of them.

Howland Clarke
Parry Sound, Ontario, Canada

Send your letters to: Repartee, *AmigaWorld* editorial, 80 Elm St., Peterborough, NH 03458. Letters may be edited for space and clarity. ■

Hors d'oeuvres

Ideas and advice from the buffet of your experience.



If your clever idea is chosen to grace these pages, you will be one of the few, the proud, the elite, who own official AmigaWorld *T-shirts (suitable for wearing in public). With your submission (addressed to* AmigaWorld *Hors d'oeuvres, 80 Elm St., Peterborough, NH 03458) be sure to include your T-shirt size. If anyone has a bone to pick with one of these tidbits, let us know the problem. And always, always use backups of your original disks for experimenting. Dig in, and oh yes . . .* Bon Appétit!

Notepad/Textcraft Combo

You can easily load files created with the Notepad into Textcraft. All you have to do is select the Textcraft icon and the Notepad project icon together (by holding down the shift key during the mouse clicks), then go to the menu bar and select Open. Textcraft will load and then will automatically load the Notepad file that was selected. (Double clicking on the notepad icon, even if the Textcraft icon is also selected, will not work.)

Russ Jacobson
Urbana, IL

Editor's Note: Other text files, as mentioned above, can be loaded into Textcraft. This includes files created with Ed in AmigaDOS, or files from other word processors, as well as Notepad files. To load other files that don't have icons into Textcraft, use the CTRL-D method of breaking into the CLI when the credits screen appears while the Textcraft disk is booting. Simply type in Textcraft *followed by a space, and then the name of the file to load into it. (Remember to follow the format for identifying files; for example, if your file* letter *is on a disk in an external drive, you would type TEXTCRAFT DF1:LETTER. If it is in a subdirectory on the external disk, named for instance* mail, *you would type TEXTCRAFT DF1:MAIL/LETTER.) Once your file is in Textcraft, saving it will assign it an icon.*

Circuit Design With Graphicraft

While fooling around with Graphicraft, I discovered that the Brush files can be easily edited and changed to electrical symbols and saved. This will allow you to create electrical circuit designs. The easiest method I have found to keep things orderly is to keep groups of similar parts (e.g., wires, resistors, diodes, etc.) on the same brush palette. Shifting between brush files is not difficult, but it is time consuming. One word of advice: Draw all parts facing four different directions in order to be able to place them anywhere in the design. This method is much cheaper than the commercial programs and is only limited by your imagination. The only drawback is not being able to test your designs functionally on the computer.

Daniel W. Ruhl
Jacksonville, FL

Point Finding In Amiga Basic

Here is a tidbit I wrote that is very useful to me as an Amiga Basic programmer. At times I need to know the location of specific points on the screen. I allow my main program to draw objects on the screen, then STOP the program and run this little routine. Clicking the left-mouse button produces the coordinates. This way I can easily find the vertices of any object on the screen.

```
POINTFIND:
IF MOUSE(0) = 1 THEN
  PRINT MOUSE(1),MOUSE(2)
END IF
GOTO POINTFIND
```

MOUSE(1) returns the X coordinate and MOUSE(2) returns the Y coordinate.

Jeff Kerschner
Berwick, ME

Easy Chair Amiga

How many times have you wished you could sit back in your easy chair while typing letters, playing games or just hacking? I found a simple way to do this and it only requires a few cables from your local Radio Shack store. You can replace the keyboard cable with a Modular Handset phone cable of any length and the mouse cable with any joystick-extension cable. You must be sure that you get the Modular Handset cable because the Base Unit cable uses different connections.

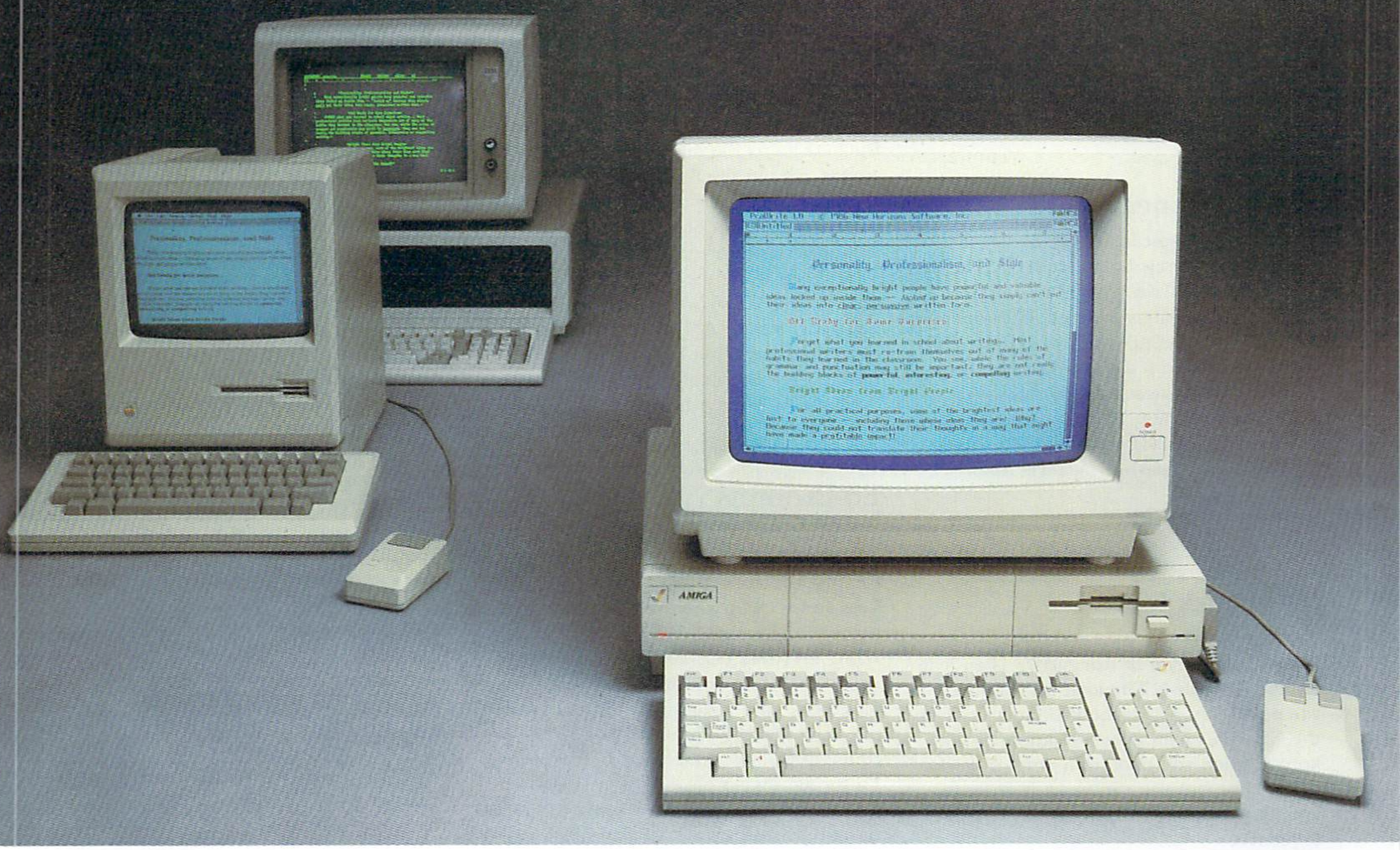
Steve Palm
Cheboygan, MI

Editor's Note: Extending keyboard and mouse cables might cause RFI interference (this can produce a fuzzy picture on the monitor or TV) if the cables aren't shielded or if there is a strong radio-emissions source nearby. Also, when you use any non-Commodore-approved cable or peripheral, you are taking a chance of harming your Amiga. And, see the warning below.

Don't Unplug

Do not disconnect the keyboard from the Amiga in the middle of a project! If you do,

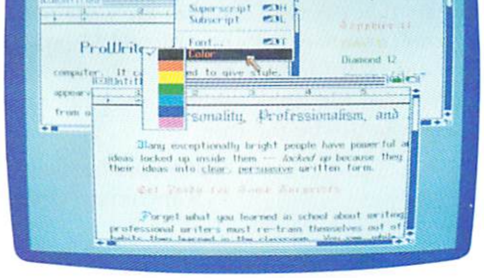
Now Look At Word Processing In A Whole New Light.



ProWrite.™ All Others Pale By Comparison.

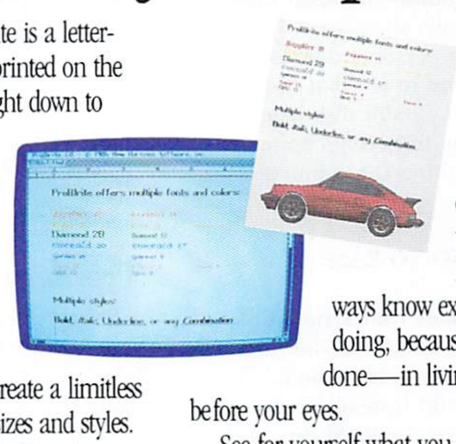
You chose Amiga® because you wanted something more. Now you choose your software for the same reason. Which makes choosing ProWrite word processing a very bright idea.

The Full Spectrum of Capabilities. ProWrite lets you select more than just a typeface: You get proportionally spaced character fonts. Brilliant color. Unsurpassed graphics capabilities. And no surprises. Because what you see on the screen with ProWrite is a letter-perfect picture of what you'll see printed on the page— from header to footer, right down to the last pixel.



Creative Control: A Brilliant Stroke. With six pull-down menus, just a click of the mouse or a few keystrokes is all you need to create, delete, copy, alter, move and otherwise manipulate text. Multiple selections create a limitless choice of character fonts, colors, sizes and styles. Customize everything from a daily diary to an annual report, including color graphics. And with headers and footers always clearly displayed, ProWrite makes even advanced formatting as easy as dragging a mouse.

Ease of Use: Another Bright Idea. ProWrite delivers more of what you bought Amiga for: Professional output. Multi-tasking power.



A "creative edge." You can open up to eight windows at once—and perform a variety of editing tasks between them. With ProWrite, you'll always know exactly what you're doing, because you see it done—in living color—right before your eyes.

See for yourself what you get with ProWrite. Then, just for fun, take a look at the others—and watch them pale by comparison.

New Horizons
SOFTWARE

First In Personal Productivity And Creativity.

New Horizons Software, Inc. PO Box 43167, Austin, TX 78745 (512) 329-6215

Circle 38 on Reader Service card.

the Amiga might perform a warm start as if you had pressed Ctrl-Amiga-Amiga. While this doesn't happen every time the keyboard is disconnected, it seems more likely to occur during "keyboard intensive" operations, like word processing. The manual doesn't mention this, so I thought I would.

Kevin Allen
Ventura, CA

Apple Connection Fix

Your July/August issue was, by far, the best so far. Andrew L. Hollander's "The Apple Connection" was great, but one problem was immediately evident. After opening a window, the default width is infinite. So the first line of the data being transferred will appear on the screen, but all subsequent lines will not. This is easily corrected by adding a WIDTH statement after opening the window, such as WIDTH 80 or WIDTH 128.

Joe Conte
N.H.P., NY

RAM Disk Icons 1.2

One of the many nice additions in the version 1.2 release of AmigaDOS is an icon for the RAM disk. The icon is generated when you first access the RAM: device from the CLI. This icon does not automatically appear when you boot on a normal Workbench disk, but you can make it do so by adding the line DIR RAM: to the startup-sequence.

The RAM: device is empty when you boot, so this command does nothing but make the system "build" the RAM disk.

Assuming you have already used IconEd to create your own personal disk icons, you may be disappointed to see that the RAM disk icon is the old default disk icon. To change this, use the following command in place of the do-nothing Dir command suggested above:

```
COPY DISK.INFO TO RAM:
```

This command copies your system disk's icon image into the file Ram:Disk.info, where it will be used to draw the RAM disk's icon. You could instead create a customized icon just for the RAM disk and keep that icon in a separate file on the system disk. If your RAM disk icon were called, say, Ramdisk.info, you would use this startup-sequence command:

```
COPY RAMDISK.INFO TO
  RAM:DISK.INFO
```

Some notes: First, Intuition apparently ignores the extra disk-type info file on the system disk. Next, since the RAM disk icon is created only once each session, there is no need to leave the Disk.Info file in the RAM disk after it's been used. Third, a Snapshot of the RAM disk will not be permanent unless you copy RAM's Disk.Info file back to its file on the system disk. Of course, files in the RAM disk will be lost when you reboot or turn off your Amiga.

Let me mention once again that this trick will only work on version 1.2 system software. I was using the Beta-4 release: Kickstart version 33.667, Workbench 33.33. The behavior of the RAM disk icon might conceivably change, but I hear that developers have been told to conform their software to the Beta-3 release, whatever that means!

Marcus Brooks
Austin, TX

Ed Prompts

If you're like me and you use Ed a lot, you also keep forgetting what keys do what. I end up overusing the "easy-to-remember" keys and wasting a lot of time thumbing through the manual. Here is a better way. Using Ed (what else?), make a cheat sheet with all the info you think you'll need. Make sure that it doesn't fill up more than one screen and then save it as EdHelp, or something you'll remember. Before using Ed for another project, just enter TYPE EDHELP. You'll see your screenful of information appear. Next, use Ed as usual, and anytime you need some help, simply click the window depth arrangement gadget in the upper right-hand corner of the screen; your list will appear. Click the window gadget again to return to your Ed project. The only drawbacks to this technique are that you have to do it for each Ed session and the help screen can only take one screen or the info at the top scrolls off.

James Nakakihara
Utsunomiya, Japan

Transferring Preferences

Some Amiga software will not load if your Workbench disk has been loaded before it; therefore, the most obvious way of using the same Preferences settings as on your Workbench disk is to open the Preferences on the new disk and reset everything. However, there is an easier way. Although it doesn't say so anywhere in the manual, everything saved in Preferences resides in the system-configuration file. To easily transfer all your settings to a different disk, just enter the following line from the CLI:

COPY WORKBENCH:DEVS/SYSTEM-CONFIGURATION TO *YourNewDisk VolumeName*:DEVS/SYSTEM-CONFIGURATION

Don't forget to make a backup of any disk that you are writing to before using this technique.

Mark Cashman
Windsor, CT

Better Video

I have a tip on how to get a sharper picture from your Amiga to your VCR. You'll need to buy a normal Commodore 64 monitor cable and a Y adapter. (Commodore's own 64 cables have three connectors to the monitor; some third-party ones have a fourth, an additional audio jack.) Plug the cable into the Amiga's TV modulator output (TV MOD on the back) and, after identifying the chroma and the luma sources on the other end, plug them into the Y adapter. Plug the other end of the adapter into the Video In on your VCR. I found that this nearly doubled the sharpness of the picture.

Shawn Farrell
Hastings, MN

Assembly ROM EXEC Erratum

For all of you ROM EXEC function-minded assembly-language programmers: The documentation for the AmigaDOS developers manual indicates that the prefix LVO_ should be used for the ROM EXEC subroutines. Through ingenious programming techniques, I've found that the prefix should instead be _LVO. Also, this error is not indicated in the sensuous errata pages in the manual.

Captain Bytes
Los Angeles, CA

Scrambled Snapshots

In the last issue of *AmigaWorld*, I noticed some tips on using Snapshot. Most of the time these tips worked fine, but every once in a while I found that my icons were stacked and scrambled even after I had cleaned them up and "taken" the snapshot. I finally tracked the problem down; it appears that if any of the files are write-protected, you may get unpredictable Snapshot results. You would think that only the write-protected file icons wouldn't move, but this seems not to be the case.

Robert L. Pleatman
Cincinnati, OH ■



Desktop Video

More than a new buzz word, Desktop Video is an affordable reality. And your Amiga is the perfect video computer.

By E. E. Eric Erzinger

Desktop video is a brand new application for personal computers. Instead of a monitor or printer, desktop video uses a videotape machine as its primary output device. A desktop video system may consist solely of an Amiga used to generate graphics-animation sequences, or it may include a battery of devices that let you combine computer- and video-generated pictures into a finished video product. The fact that the Amiga's video output can be synchronized with external video sources makes the Amiga the best choice for people interested in desktop video. From just-for-fun home video production to professional graphics and character generation, the Amiga gives you the power of systems costing ten times as much.

In this article, I'll present an overview of video production and applications. I'll examine how the Amiga makes video production an affordable reality for individuals, and take a look at the available video hardware and software. I'll conclude with a look at how some people are already making use of desktop video.

Here, There and Everywhere

Strictly defined, video is the electronic medium for recording and retrieving visual and audio information on magnetic tape. For most people, contact with the world of video means a visit to the local movie-rental store. The movies are usually stored in ½-inch VHS (video home service) or Beta format, or on 8mm cassettes. In addition, many people now own video cameras and produce their own videos. With the cost of cameras decreasing steadily, video production is coming within the means of more and more people.

Outside the home, the use of small-format video is most apparent in education, starting at the elementary level, where videotape decks have all but replaced 16mm film projectors and slideshow presentations. Continuing on into intermediate and high school classrooms, students become involved in producing videos for class projects, theater arts departments and personal sports training. These videos, while often innovative and creative, are usually technically crude. The inability to add graphic artwork, titling and animation, and the prohibitive expense of a $4,000 ½-inch-tape editing system, keeps the quality of such efforts low.

In contrast to home and educational applications, professional video production is dominated by expensive, industrial equipment. The term "industrial" is somewhat misleading in this context. It doesn't refer to steel mills or auto plants, but to the ¾-inch U-matic and Betacam formats that are mainstays of professional video production. (When used for broadcasting, these formats generally get "bumped up" or edited to one-inch tape.) Besides the quality of the tape format, the other substantial differences between low-end and industrial-strength video production are the quality of cameras, lighting and special-effects capabilities (wipes, fades, dissolves, titling, etc.) available to professionals.

One-inch and ¾-inch video decks are used for the production and viewing of videos in a myriad of fields: business presentations, training, safety, general teaching aids, sales, real estate, in-store promotions, remote television recording, commercials, video art, and video assist and special effects in feature filmmaking. These are in addition to the better known applications in the cable and broadcast television industry. In many cases, videos produced on professional equipment are transferred to ½-inch format for large-scale distribution. This represents the hierarchy of video production: Professionals use expensive, large-format equipment to produce products that are widely distributed; individuals and small companies have limited access to good equipment and little chance to produce high-quality work. Desktop video, of course, changes all that.

Form and Freedom

Whether you're a network producer or a home enthusiast, the nuts and bolts of video production depends on two things: what you have for equipment and what you want to do. No matter what your budget or project—commercial, educational or just for fun—basic video production routines remain the same. These routines fill the space between your bright idea and the finished videotape. And the key routines are those that you follow in *pre-production*.

After project outlining and script writing, pre-production is focused on the development of a storyboard. Storyboards are similar in format to comic books; they are made up of scene-by-scene sketches, often with text, ►

ILLUSTRATED BY SANDRA FILIPUCCI

showing the flow of the planned video. Storyboards help further in designing the look of a video. In large projects, these boards are used by lighting, set and costume designers in coordinating their individual contributions to a project. They are used by the producer and director to map out the production logistics and general flow of a project. Of course, if you are your own producer, director, writer, etc., you only need one copy of the storyboard.

Special effects such as overlay titling (character generation), artwork and audio tracks are created in advance. If you have the right equipment, these effects can be mixed, merged with or cut into your video during actual taping through either an audio mixer or video switcher (special-effects generator) in the form of fades, wipes and keying. After actual taping, the process

Video in the Park

The Amiga played a part in the production of a unique outdoor video festival produced in New York City in August 1986. The event, called *Video in the Park*, attracted more people than any other publicly-sponsored event held in the New York City parks. About 50 different videos were shown on consecutive evenings on 20-foot video screens using Eiophur projectors. Funding came from a non-profit organization and some major corporations.

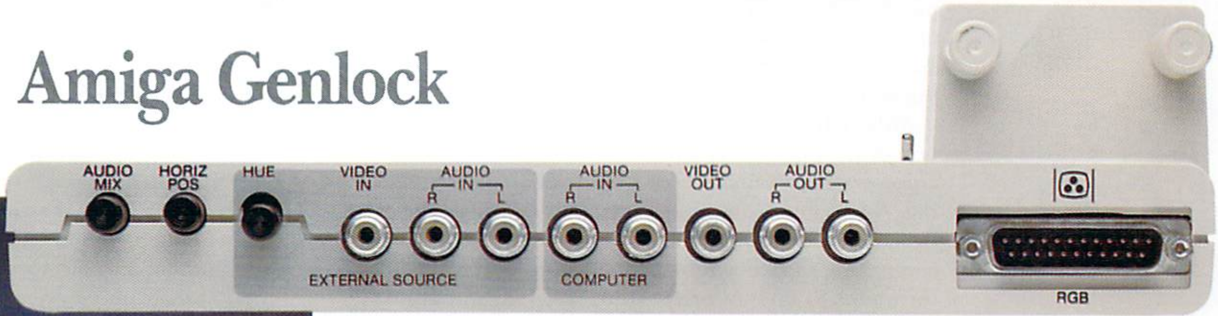
For the event, ABC producer Bob Brakestone hired Brian Stein and Greg Tzadilas to create full-frame, animated logos and production credits with the Amiga. The work was done with DeluxePaint and DeluxeVideo. Brakestone wants to see the Amiga used more in character generation; traditional systems used in production and broadcast cost around $90,000. "For a lot of applications," Brakestone said, "the Amiga and DeluxePaint or DeluxeVideo can substitute for the Quantel Paintbox or the Chryon Character Generator. . . but, with DeluxeVideo, images can be jerky—it doesn't smooth-crawl and scroll like other character generators. So when we did *Video in the Park*, we used full-frame animation instead.

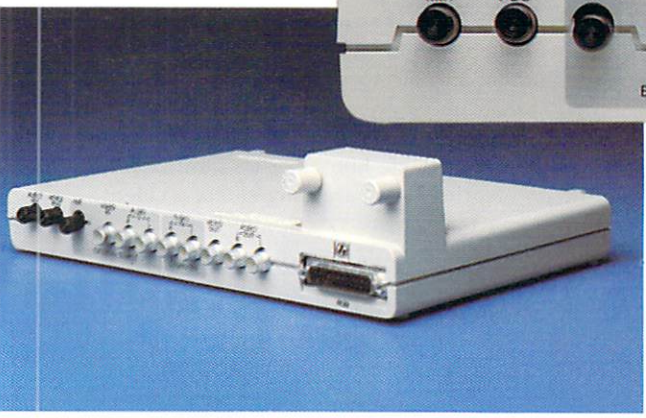
"For the $1,100 to $1,200 price, the Amiga has a lot of post-production applications. Throw in the frame grabber, sync [*genlock*] and buffer, and the Amiga will be just as good or better than existing products on the market." Brakestone added that independent video producers especially could benefit from the system. The Amiga's use in video and TV production, he said, is "very, very exciting."

Other professional atmospheres where the Amiga is being used are: Canada's CBC TV station, where it is being used for storyboarding and frame-by-frame animation dumped to video; TV Arts Video Company, which is using the Amiga with a laserdisc; and Cranston/Csuri Productions and Ohio State University, who are jointly developing a 3-D system for the Amiga.

—Abigail Christopher

Amiga Genlock





Called a *sync* by people in the video industry, a genlock is vital in combining the graphics output of a computer with the video output of a camera, laserdisc or videotape deck. The Amiga Genlock 1300 from Commodore synchronizes an external video signal with the video output of the Amiga, allowing you to overlay Amiga graphics onto the external video picture and to display the result on your monitor. You can also output the combined video/computer signal to a videotape machine or to a cable system or broadcast transmitter.

The Amiga Genlock works by substituting color 0 from the current Amiga palette with the picture from the external video source. For example, if you use the Genlock to overlay the Amiga Workbench screen onto a shot from your video camera, the picture from the camera will replace the blue (color 0) of the Workbench screen, and the resulting combined picture will show up on your Amiga monitor.

The Amiga Genlock connects to the RGB port of your Amiga. It combines the RGB signal with whatever is connected to its Video In port and sends the result to both an RGB-Out port and a composite-Video Out port. The Genlock also has four audio inputs and two audio outputs. These let you combine the audio output of the Amiga with an external audio output, in stereo. Switches on the Genlock let you control which signal (Amiga, external video, or combined) gets output.□

goes into post-production editing, not unlike film editing except that the tape isn't actually cut and spliced, but rather the images are transferred from one tape and machine to another. On a simpler level, an edit controller allows precise timing of the electronic and mechanical events necessary to achieve insert and assembly. Insert and assembly editing is exactly what it sounds like: scenes from one tape are inserted between scenes on another, or scenes are assembled one after the other in the desired sequence. More sophisticated installations use A-B roll. A-B roll is the procedure that allows you to edit from two or more machines down to one master tape for your finished product.

Enter Stage-Left: Amiga

The traditional role of the computer in video production is found in two basic areas: as a graphics/titling tool and as an edit controller. That baseball game score that flashes across your home TV screen has been created using a sophisticated and expensive character generator. The computer graphics you see on the evening news are the products of computer systems much larger than the Amiga. As it turns out, the Amiga is very capable in these areas.

Many people involved in video production find it hard to believe that a personal computer can be a powerful tool in their work. Like computer enthusiasts who know little about video, video professionals are not well informed about the potential of using Amigas in video production. Until the advent of the Amiga, comparable computer-generated graphics, animation and design have been limited to machines costing from $10,000 on up that require the talents of highly-trained programmers and technicians. And character generators usually start at three times that price.

Desktop Video Hardware

Your desktop-video system begins, of course, with the Amiga computer and a videotape deck. The Amiga can interface with any tape deck that accepts an NTSC input. Depending upon your resources, you can use anything from a $250 VHS VCR to a mammoth 1-inch professional editing deck. Once you have the basic hardware, you can expand your system with more specialized products.

Special hardware designed to take advantage of the video potential of the Amiga has been eagerly awaited (and somewhat slow in coming). The most important of these, and consequently the most eagerly awaited, is Commodore's *Amiga 1300 Genlock*.

The Amiga Genlock is the first consumer-priced, stand-alone computer genlocking device of its kind. In a nutshell, the Amiga Genlock permits the graphics and audio created on the Amiga to be overlayed on an external video source. This source can come from a camera, VCR or laser disc. The resulting combined image can be displayed on your monitor or TV set, or recorded on videotape. The ability to combine com- ►

PHOTOGRAPH BY LARRY DUNN

puter- and video-generated pictures is the cornerstone of desktop video. And the Amiga is the only widely-distributed personal computer that can perform the feat.

Although the output of the Amiga Genlock is not broadcast quality, you can still build a powerful desktop video system around it. For broadcast-quality genlocking, Associated Computer Services is developing *Genkey*. Designed by the award-winning Sci Tech in Miami, this genlocking device will be broadcast quality and will sell for under $1,000—a price within the range of any broadcast or cable TV station.

New Tek's *Digi-View* and the long-delayed *Amiga Live!* from Commodore are also invaluable desktop video tools. These products take external video sources and digitize them (i.e., turn the analog signals of the video camera into the bit-planes used to display graphics on the Amiga). Digi-View sells for $199.95; Amiga Live! should come in between $300–$400 once all the bugs have been ironed out in design and manufacturing. Amiga Live! is a more complicated device than Digi-View; it digitizes images in real time.

Like other Amiga graphics, digitized images can be combined with other video sources and output to video tape. Digitizers provide one more input—and a very high-tech one at that—for your final video project.

Beyond a genlock and a digitizer, you should probably look for some way to edit your video products. This can involve purchasing a second VCR (and doing a lot of button pushing) or even acquiring a professional editing deck. Another option is the Sony *RME-100V Edit Controller*, which, for about $200, lets you control two 8mm decks at once. As the popularity of consumer-oriented video expands, watch for such editing hardware for other popular home decks.

One final area to touch on is that of video sources. Unless you plan to make videos that are entirely computer generated, you need alternate video sources. The most common, and most important, is a video camera. A good video camera gives you the flexibility you need to produce quality videos. Whether you're a realtor taping a listing of available houses or an industrial training officer creating a new training video, a video camera is a virtual necessity.

Video Software

The success of desktop video depends upon powerful, easy-to-use software to create the graphics and drive the hardware. Aegis Development and Electronic Arts are at the fore of Amiga desktop video development. Both companies produce paint programs (*Images* and *Deluxe-Paint*, respectively) that are excellent sources for desktop video images, and both have animation products designed with desktop video in mind. *Animator* from Aegis concentrates on polymorphic tweening, while *DeluxeVideo* from Electronic Arts is superb in animating BOBs. Both are excellent character and special-effects generators.

More specialized video software is also showing up for the Amiga. *Caligari*, from Octree Software, is a professional 3D-animation scene creator for the Amiga. [*See our description of Caligari in this issue on page 24.*] *Mandala*, from Very Vivid, features interaction between video images and any computer-controlled process. *Mediaphile*, from Interactive Microsystems (see p. 21), in its current version lets your Amiga control a Sony 8mm tape deck and in the future will let you control two decks for editing purposes.

JDK Images produces *Pro Video CG I*, a package designed to let your Amiga function as a video character generator. It retails for $199.95. Other companies such as Futureware of Richmond, British Columbia, and Brown-Wagh Publishing, in California, are offering font sets for the Amiga that can be used in video titling. *Infominder 2* from Byte by Byte is able to control videodisc players. You can use it to add videodisc-based images to your video productions.

Station Manager, a product of Associated Computer Services of Springfield, Missouri, sells for $1,995. Station Manager does exactly what it says—from payroll to programming (the television kind). It even produces weather-report graphics. In this function, Station Manager supports hi-res, IFF, color cycling and an interface with a national weather service. The weather graphics are also available separately. This system has been tested at a network affiliate with exceptional results.

Coming into Play

Is Amiga desktop video a viable alternative or adjunct to traditional video production? A lot of professionals think so. Richard Lewis, Art Director at Amblin Produc-

Companies Mentioned:

Aegis Development
2210 Wilshire Blvd. #277
Santa Monica, CA 90403

Associated Computer Services
839 South Glennstone
Springfield, MO 65802

Byte by Byte
3736 Bee Cave Road, Suite 3
Austin, TX 78746

Brown-Wagh Publishing
16795 Lark Ave., Suite 210
Los Gatos, CA 95030

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404

Futureware Computer Products
PO Box 94276
Richmond, BC, Canada V6Y 2A6

Interactive Microsystems
PO Box 338, Cambridge Center
Cambridge, MA 02142

JDK Images
2224 E. 86th St., Suite 14
Bloomington, MN 55420

New Tek
701 Jackson, B3
Topeka, KS 66604

Octree Software
1501 Broadway, Suite 1800
New York, NY 10036

Sony Video Communications
Sony Drive
Park Ridge, NJ 07656

Very Vivid
1499 Queen St. W. #302
Toronto, Ont., Canada M6R 1A3

MediaPhile

For people interested in interfacing their Amiga with the latest video equipment available for the general consumer market, Interactive MicroSystems, in Boxford, Massachusetts, has a complete audio/video system that is quite unique.

MediaPhile is centered around the new Sony EVS 700U Video 8 Deck, an 8mm VTR that has some features not found on your normal VCR. Not only does the Sony deck have the standard freeze frame, slow motion, frame step, flying erase head and other VCR recording and playback goodies, it can also record up to 24 hours of digital stereo sound on one cassette. (about 36 LP albums). Throw in a 181-channel tuner, MTS and FM simulcast reception, IR remote control—all cable ready—and you have a pretty versatile little deck that sells for $1,329 retail.

So where does the Amiga come in? MediaPhile is a combination hardware and software interface that lets your Amiga act as a remote-control device and database. With MediaPhile, you can do just about everything that can be done with the Sony deck, with a few added niceties like mouse control, talking feedback, full-screen display of everything going on, and nicest of all, programmability. MediaPhile lets you store and recall databases of information about your 8mm tapes and control the deck features through mouse and keyboard commands. For example, you could create a database of 36 albums of music stored on a single 8mm cassette tape (each song listed separately); then, by clicking on an individual title, the program will activate the VTR, search for the right counter number and play back the song.

That is the simplest thing that MediaPhile does. You can enter an entire string of commands so that the VTR searches and plays back any number of songs, sections of video, or both, in any order, no matter where they are on the tape. You can also use the MediaPhile system for video and audio editing. (The next version of MediaPhile is intended to include dual VTR control features.) For putting it all together or just playing it back, MediaPhile is a pretty slick system for multimedia buffs, but it is not for everyone, unless you were thinking about buying the Sony EVS 700U deck anyway. Otherwise, MediaPhile might be better left for those who have a particular application in mind or who love new tech video/audio/computer equipment.

The price tag of $1,329 includes the software, cables, interface unit and a modified Sony EVS 700U deck. You can't use the deck without the modification. Interactive MicroSystems will modify your deck for $120. For customers who already have a deck or choose to buy it elsewhere, they offer the MediaPhile software, interface unit and a deck modification kit for $279.

The System requires a 512K Amiga with two drives. A second monitor certainly helps, unless you have a genlock. (If you do have a genlock, you only need one montior and MediaPhile will superimpose the VTR control icons over the video image. A very nice touch for editing purposes.) Interactive MicroSystems is also developing MediaPhile systems for other decks (VHS and Beta) and is continuing to add new features. If you're interested in MediaPhile, write to Interactive MicroSystems at Box 272, Boxford, MA 01921, or call 617/887-9607.□

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tions, creators of *Amazing Stories*, has been using the Amiga to storyboard and design sets for episodes of the show. Recently, through the assistance of the creative services department of Aegis Development, real-time, Amiga-digitized video images have been used in actual broadcast. Dick Shoemaker of *Entertainment Tonight* uses the Amiga as does Louis G. Friedman, late of Lucas Films, now head of Production Logistics in L.A. He calls the Amiga the "most incredible machine available at the price." Producer Bob Breakstone of ABC in New York, who masterminded *Video in the Park* (a six-day outdoor video fest), used Amiga art by Greg Tzidala and Bryan Stein for the opening logo and rolling credits of the event. (See p. 18.)

One interesting testimonial comes from Linda Windler of Topeka, Kansas. Last February, Linda was a freelance artist who hated computers. One night her husband, who works at a local computer store, brought home an Amiga, a paint program and Animator. Two weeks later, she was hired as graphics art director for NBC affiliate KSNT. In addition to her work at the station, Linda used the Amiga to create "The Land Oz," a halloween attraction at the local mall. This trip down the yellow-brick road is lined by Amiga-designed artwork and large-screen video projections.

The Rewind

I saw my first videotape deck at Electronic City some 25 years ago. It was a huge, black-and-white, reel-to-reel, "steam-powered" affair. After buying a monitor, cables and such, it cost about $3,000. Today, for about the same price, you can have completely automatic, full-color video recording and editing capabilities, with stereo sound and the latest in digital special effects. The Amiga fits beautifully into the existing creative world of video.

That's Desktop Video. On the low end, it's a means of adding titles, sound and fancy graphics to home videos and films. On the high end, it's a valuable, practical tool in video art, business presentations, education and training, television shows, commercials and motion pictures. Desktop video is to our increasingly audio/visually-oriented world what desktop publishing is to the world of print. It brings several powerful technologies, and the potential of creativity with their combination, within the grasp of those individuals who want to create, work and play at the forefront of new technology.■

Write to Eric Erzinger at PO Box 2181, Bullhead City, AZ 86430.

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Caligari: Amiga Software For the Video Professional

High-quality video animation used to require a system costing over $60,000. Now, Caligari can do it at a fraction of the price.

By Stefan B. Lipson

Caligari is the first Amiga-based software for three-dimensional animation and modeling. Developed by Octree Software of New York, it sets a new standard for three-dimensional video animation. Displayed in the Commodore booth at the August SIGGRAPH show in Dallas, the Caligari system attracted considerable praise, and with good reason: Taking advantage of the excellent graphics capabilities of the Amiga, Caligari can achieve the type of video animation that could previously be created only on workstations beginning at around $60,000.

Not only does Caligari represent the most inexpensive professional system available, it is also probably the easiest to use. The software includes an interface that features pull-down menus and easily identified icons for accessing the various editing features.

Shapes and Modes

Basic objects such as spheres, cubes and other assorted polyhedra can be selected from the Objects Menu. (For those of you who've forgotten, polyhedra are solid shapes bounded by polygons.) These shapes may be altered and combined to create a library of objects to be used in future animations. Using the objects in the library, you then set up the scene in which the objects appear, specifying how and where the objects are to appear, the camera angles, the speed of animation and other script-related details. You can then preview the animation with the Preview Option and store the segment on videotape if you are satisfied with it.



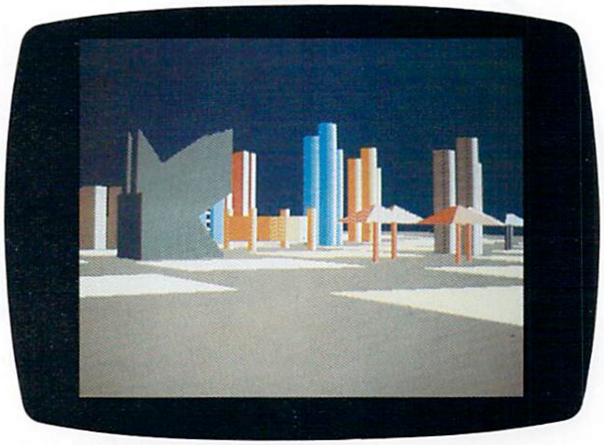
Caligari takes full advantage of the Amiga's exceptional graphics, providing three different modes in which to work. The high-resolution mode provides 704 × 440-pixel resolution with any 16 colors displayed on the screen at once. (Normally the Amiga provides a resolution in hi-res mode of 640 × 400 pixels with a border around the image. This border is unacceptable in video animation since it also gets transferred to the videotape. In Caligari, the border has been removed, increasing the dimensions of the image to 704 × 440 pixels.) The medium-res mode gives the user 360 × 440-pixel resolution with up to 32 colors displayed simultaneously. The hold-and-modify mode is also a medium-resolution mode, but it allows for 4,096 colors on the screen at one time.

For smooth shading, Caligari uses the Gouraud Shading algorithm. This algorithm defines an object as a series of planar surfaces and then illuminates each plane's surface by specified light sources directed at them. The color intensity at the center point of each plane is calculated, the values are summed across the object, averaged, and then used to determine the color shading across the entire surface. This smooth shading option requires a wide range of colors and is therefore available in the hold-and-modify mode.

System Components

The menus give the user access to the three basic modules of the software: an object-design module for creating and storing three-dimensional objects; a scene-design screen for designing the scene in which the objects are to appear; and a script-editing/video module for previewing a skeletal version of the scene and for sending the image to a video recorder. Brief descriptions follow.

1. *The Object-Design Module.* The object-design module





lets you create and store any number of three-dimensional objects, which can be used individually or pieced together to create more complex shapes. For example, a number of tetrahedra could be pieced together to create the name "AMIGA." The new shape may then be stored in the library for later use. Editing commands such as stretch, rotate, extrude and compress allow you to alter the objects in every way imaginable.

2. *The Scene-Design Module.* The scene-design module lets the user lay out the entire scene. The design screen initially appears on the monitor with a three-dimensional checkerboard receding into the distance. Distances are clearly marked along each of the three planes. Even the mouse crosshairs simulate three dimensions.

Menu options for the scene-design screen allow the user to traverse any of the axes and to view the scene from any specified angle and distance. The user may then call an object or group of objects up from the library and place them anywhere on the set. A wide range of editing commands allow you to move or change location of the objects. You can view the scene from any angle and from any axis with a quick press of a mouse button. Once complete, the scene is saved in much the same way that an object is saved in the object-design module.

3. *The Script-Editing/Video Module.* With the scene complete and the objects in place, the user can instruct the system to display an on-screen preview of the animation. For example, by selecting two points on the screen, Caligari will animate the scene as if the camera were moving from one point to the other, moving at user-defined intervals. The program takes care of all of the essentials, such as angles of rotation, perspective and hidden surfaces.

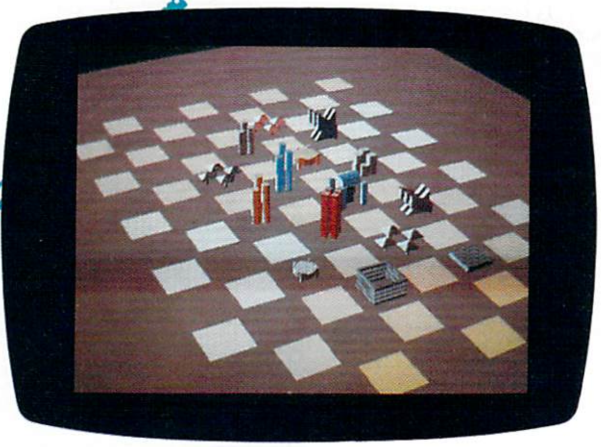
The Script Editor also allows you to enter commands in batch mode. This allows you to create a file containing all of the necessary commands to be run in sequence. Written in a format similar to that of a move in the game Adventure, a command such as "Move from 0,0,0 to 10,10,10 in Arc" would simulate camera movement between the designated points following an arced path.

Caligari's Script Editor can even accommodate the placement of multiple light sources as well as diffuse and specular lighting. The system is flexible enough so that the user can, for example, revolve around a scene while simultaneously reducing the camera's angle to the horizontal and changing the location of any and all light sources.

Real-time Animation Previewing

Complex layouts with elaborate animation routines have in the past required an inordinate amount of computing time, making it difficult to construct individual images quickly enough to provide a sense of animation. To address this, Caligari has employed a unique preview system that shows only a skeletal sequence where the objects appear to be built out of wire frames. If fully rendered, each image would otherwise take from one to sixty seconds to realize. By drawing only the wire frames, the user can see a facsimile of how the animated segment will appear without getting bogged down by computing time.

Once satisfied, the user can send the sequence of images to the video recorder in a fully automated sense: The sequence of images and scenes are "queued up," or listed in order of creation. The machine draws one, the single-frame video controller transfers the drawn image to the videotape, the next image is drawn ▶



and transferred, and so on until the entire sequence is saved on tape.

Image Reproduction and Format

Due to the complexity of the images, Caligari would require enormous amounts of memory if conventional storage and data-retrieval techniques were used. The problems surrounding disk storage and retrieval have been circumvented by employing a unique three-dimensional database in which the elementary components of the objects are stored in hierarchical fashion. With the database concept, the images to appear on the screen are not actually stored on disk, but are instead fetched and assembled from the database. This approach makes the creation and composition of each screen much faster because the database is very compact, and disk access (which slows down processing time) is eliminated. The database approach also allows multiple users to share full libraries (i.e., a database of objects that you have created) without having to copy and reload numerous disks.

Caligari will also allow you to store the scene to disk if so specified. Using IFF format, the image may then be transferred and altered using any of the Amiga graphics packages. This also allows you to output hard-copy excerpts of your videotape animation.

In the Right Place

Who's interested in a product like this? Everyone who ever wanted to get involved in video animation, of course, but the system requires the patience of an individual who can put in several hours of work to produce a high-quality segment that has a short running time. Several advertising agencies have already inquired about Caligari as a means of creating in-house animation mock ups. Art schools and television studios also stand to benefit tremendously from a system that offers so much for so little. In fact, Roy Kissin, co-producer of Bruce Dern's recent movie, *On The Edge*, has made inquiries into Caligari for his own use.

Hardware Requirements

In order to animate the images and capture them on videotape, you must also have a *single frame controller*, a piece of hardware used to transfer the image created by Caligari onto the videotape. Any of the available frame controllers work with the Octree software, and they range in price from $750 to about $3,500. The system can work with a variety of video recorders as well as a variety of formats. To operate the system, the video recorder is plugged into the frame controller and the frame controller is plugged into the serial port of the Amiga. For professional applications, Octree recommends using 1.5 megabytes of RAM. Although the cost for the hardware and software may seem high for the home user, it is extraordinarily low for the professional who is in need of such a tool.

Caligari for the Home

Caligari was originally conceived for the professional video market, but a second version of the Caligari system will also be made available at a reduced price for home users. The low-end version of the software will require 512K and act primarily as a three-dimensional modeling system. It will offer the same editing features as the professional version, including the smooth shading option. Interestingly enough, the Caligari video demo *We Built A City*, shown in the New York SIGGRAPH video show in June, was created on an Amiga with 512K.

The home version will not include the modules for scripting and video interfacing, and so it will not allow you to animate your three-dimensional images or send the images to videotape. Instead, the home version will allow you to create the image and store the completed product on disk. Because of its modular design, you will be able to purchase an upgrade to bring the home version up to the professional level.

The price for the software had not been determined as of this writing, but the underlying philosophy at Octree is firm: to deliver what no microcomputer has delivered thus far and at a fraction of the cost of presently available graphics-animation workstations.

"We're really very excited about Caligari," says Roman Ormandy, President of Octree Software. "Our field is analogous to the field of desktop publishing; the market for low-cost, high-quality graphics animation software is mushrooming beyond our wildest dreams. Caligari is the first system that allows the user to create video animation previously unobtainable without a system priced over $60,000. Our system costs a fraction of that." So far, the response of everyone who has seen Caligari has confirmed this excitement.■

Stephan B. Lipson is a writer and a staff consultant for the Yourdon Software Group. Write to him at 888 Union St., #D3, Brooklyn, NY 11215.

Octree Software is at 1501 Broadway, Suite 1800, New York, NY 10036.

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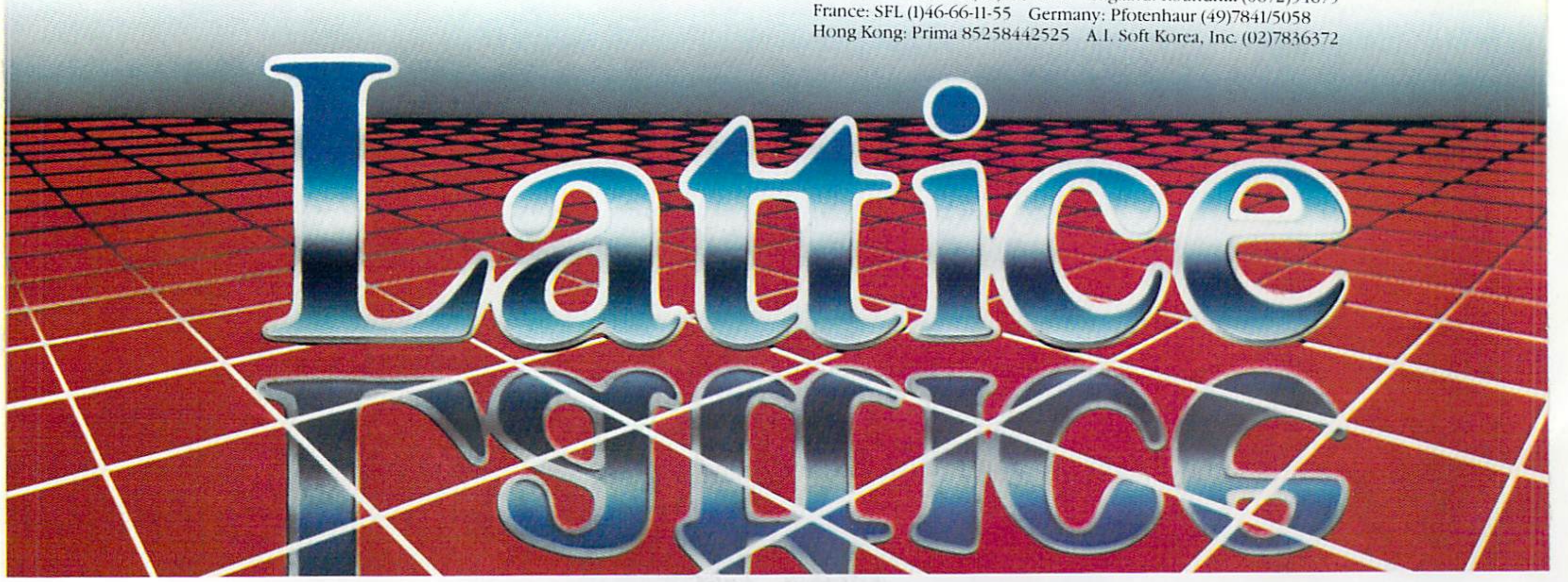
Panel will help you write your screen programs and layer your screen designs with up to ten overlapping images. *Panel's* screen layouts can be assigned to individual windows and may be dynamically loaded from files or compiled into a program. *Panel* will output C source for including in your applications. A monitor and keyboard utility is also included to allow you to customize your applications for other systems.

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Digital Sound Samplers

A survey of four products for the Amiga that allow you to digitally record and manipulate sounds.

By Peggy Herrington

A digital sound *sample* is a brief numeric recording that, when heard, is reminiscent of some real-world sound. Sound samples fool our ears into hearing continuous sound in the same way static photographs are used to fool our eyes at the movies. The technique of electronically converting sound into numbers was developed in the 1970s as a way of capturing acoustic instrument sounds to use in electronic music compositions. But because sampling requires *gobs* of computer memory—which only recently became affordable—it is only now becoming well known.

Sampling has been used on records and in movies for some time, but since sampled sounds can be extremely realistic, it's not easy to distinguish them from acoustic sounds, though they are made and played electronically. Because the Amiga is a powerful electronic musical instrument with an even more powerful built-in computer, it makes the task of recording and manipulating sampled sounds relatively easy. Compared to analog recording, sampling offers more advantages than you can shake a drum stick at, but due to limited usage, it is still, today, as much an art as a science.

Sampling Hardware

The Amiga can play digitized samples with four built-in digital-to-analog converters. These D-to-A converters reside on *Portia*, the audio chip, and each functions independently of the other three. That means the Amiga can play up to four different sampled sounds at once, (memory permitting), each one being literally anything you can hear, from a drop of rain on sheet-metal to a jazz band chorus. A couple of ways exist for getting the numbers that make up samples into computer memory so the Amiga can play them. One way is to load them from disk, either as programs or sound libraries (which is unavailable as I write this, but very well could be available by the time you read it). Another way is to download samples that other people have made available on commercial networks and bulletin board systems; some user groups have public-domain libraries with samples on disk. Another way is to "roll your own." To do this, you'll need an external hardware unit called a digital sound sampler, some software and, depending on the unit you buy and how serious you are about quality, perhaps some audio equipment. If you're gung-ho, you'll probably need RAM expansion beyond 512K.

In addition to other parts, a sampler contains, as mentioned above, an analog-to-digital converter, a device that turns sound into numbers. Although you'll need only one, four Amiga samplers are on the market now. Theoretically, they provide the same results, but in actuality these samplers and the software that comes with them are just about as different as you could imagine. They attach to three I/O ports: two to the parallel port (FutureSound and MicroGraphics), one to the second mouse-controller port (SoundScape) and one to the system bus (Micro Forge). Since peripherals such as printers, RAM memory expansion cards and video digitizers also attach to these ports, unless you're fond of plugging and unplugging things, pass-through connectors that let you switch between devices using a common port are a must. FutureSound offers a ►

ILLUSTRATED BY PAUL MOCK

replacement parallel port for your printer. Should physical clearance between the SoundScape sampler and something attached to the system bus be a problem, extenders for the mouse port are readily available at Radio Shack stores.

Altering Samples

Samples are most commonly created for use in music compositions as both imaginative and realistic instrument voices, and as such, typically require 30K to 100K of memory each. They can provide the basis for all sorts of other sounds, too. Helicopters, sea gulls, thunder rolls, racing motors, sirens, crying babies, rhaspberries and pealing bells can be as readily fashioned as alien blasters. You can sample anything you can hear, either from the original source or a recording, using only one of the Amiga's four audio channels, or two if you want separate stereo effects. (You're not in violation of copyright laws as long as you use samples of commercial recordings strictly for your own enjoyment.) Sound is fed into the sampler through a microphone or from the output of a tape player or compact disc (actually any electronic device that will boost the signal to line level), where it is converted into numbers and stored in computer memory. Once there, software for altering it comes into play. You can stretch the sound out, add all or parts of it to other samples, speed or slow it without changing pitch, change the pitch without altering it's characteristic nature, loop it to repeat internal sections, play it backwards, add reverb and echo effects, enhance what's there or make it into something entirely different. The only limits are the manipulations the software will perform and your own creativity. A little experience wouldn't hurt, either.

I made and altered samples with the following devices on a 512K Amiga, with and without two RAM expansion boards: a 2-megabyte board from RS DATA Systems and a 1-megabyte board that's available in a kit from Academy Computers. Other configurations are available from these companies, as well as some others. [*See our hardware guide in this issue.*] The ones I tried use auto-config, but offer no pass-through access to the system bus. The software that comes with the samplers will allow multitasking and, unless otherwise noted below, function with expansion RAM. Typically, I set up an internal RAMdisk and store samples there, making them instantly available for playing and editing.

Products mentioned:

DIGITAL SAMPLING DEVICES:

FutureSound ($175)
Applied Visions
15 Oak Ridge Road
Medford, MA 02155
617/488-3602

MicroGraphics Digitizer ($79.95)
MicroGraphics Images
20954 Osborne Street
Canoga Park, CA 91304
818/407-0571

Micro Forge Sound Digitizer ($349)
The Micro Forge
398 Grant Street SE
Atlanta, GA 30312
404/688-9464
Requires single-slot expander, $85

SoundScape Sound Sampler ($99.95)
Mimetics Corp.
PO Box 60238, Station A
Palo Alto, CA 94306
408/741-0117

SAMPLE EDITING SOFTWARE:

SoundShop ($49.95)
Revolution Software
PO Box 38
West Chester, PA 19831
215/430-0412

RAM EXPANSION:

1 Megabyte ($399)
Academy Computers
1720 Juan Tabo Blvd. NE
Albuquerque, NM 87112
505/296-4886
Available for less in kit form

2 Megabytes ($799)
RS DATA Systems
7322 SW Freeway, Suite 660
Houston, TX 77074
713/988-5441
Requires expansion box, $99

Amiga Sampling Devices

FutureSound, from Applied Visions, offers the most complete package. Included are a microphone, the sampling device (5 × 1¾ × 5½ inches) with preamp and RCA phono jacks for microphone and/or line-level input (signals are mixed if both are attached), a knob for adjusting the input level, a toggle switch for a printer connected to the built-in parallel port, an instruction manual and the program disk. The sampling rate is adjustable to the Amiga's maximum of 28kHz for both making and playing samples, four of which may be loaded into memory concurrently and sounded separately or in any combination. Besides recording, the main program offers many features for altering samples, among which are copying, blanking, adjusting the volume and mixing all or parts, along with flipping. It saves samples to disk in FutureSound's file format or two IFF formats (one-shot and 3-octave with repeat). Also on the disk are C-language routines and a Basic program that will access and play samples. Registered owners will receive an upgraded program that will allow access to RAM expansion memory when Version 1.2 of the Amiga operating system is available.

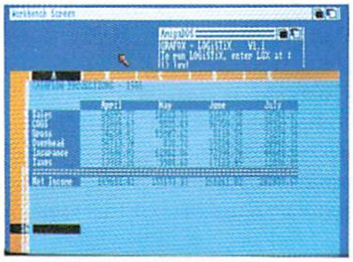
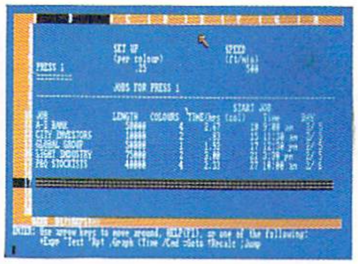
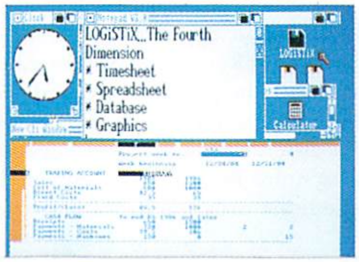
MicroGraphic's Digitizer also plugs into the parallel port. It's a tiny device, being not much bigger than the connector itself, and comes with a program disk and instruction manual. I worked with a prototype unit and software that accepted only amplified sound input at up to 22kHz sampling rate. Sample editing was not completely functional; MicroGraphics plans to provide software upgrades at no charge to registered owners in three stages: the first is a recording and editing program, the second is music sequencing in a graphics-oriented, program-like language and the third will provide full MIDI capability and accept note input from externally connected keyboards for 20 channels of sound (16 MIDI, 4 Amiga). MicroGraphics assured me the programs will save IFF-compatible disk files and function with expansion RAM, but the unit I used was not quite far enough along to test those capabilities. If this one turns out as advertised, it will be a very good deal indeed.

The Micro Forge's Stereo Sound Digitizer stands on

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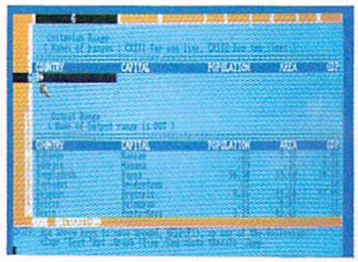
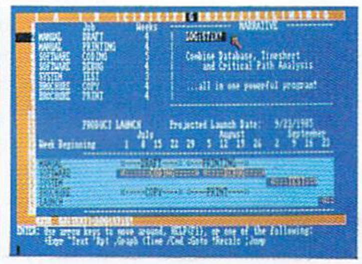
LOGiSTiX is a powerful spreadsheet. Its 2048 row by 1024 column worksheet is large enough to handle serious business applications. LOGiSTiX takes advantage of the Amiga's unique multi-tasking ability and can even use the Amiga's interlace mode to display 44 rows of your worksheet in 640 × 400 resolution mode. That's powerful!



LOGiSTiX is a powerful database that lets you store, sort, find and edit data like a stand-alone database does. The true power of the LOGiSTiX database is its ability to integrate with the spreadsheet, graphics, and time and project management functions. LOGiSTiX can also read dBase, ASCII, CSV and many other file formats (such as Lotus and Supercalc), so data compatibility won't be a problem. LOGiSTiX is fully integrated software!



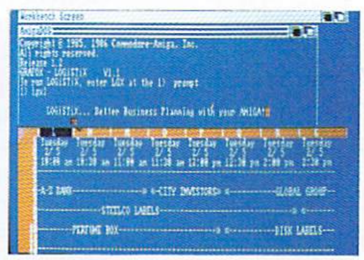



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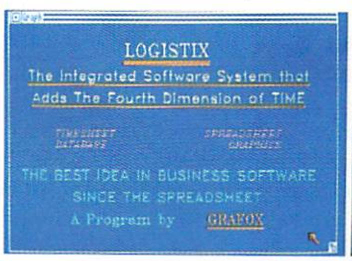
It's easy to construct Gantt charts and print them out to most popular printers and plotters (with sideways print abilities). The LOGiSTiX timesheet can be fully integrated with cash flow projections, income statements, etc., all in the same worksheet area so you can *see* the effect of time and schedule changes on your bottom line. No other project planning program offers you so much flexibility, letting you plan your time, resources and money so easily.

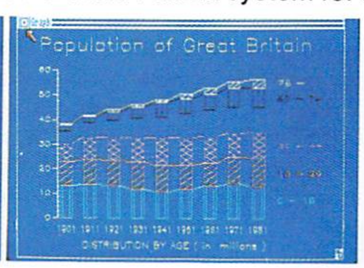


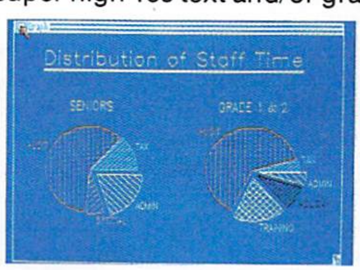




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Circle 159 on Reader Service card.

Software for Editing Sounds

Making your own samples can be a lot of fun, but it can be frustrating if you don't have access to a pretty good microphone, tape player, stereo or compact-disc player. If you can't beg, borrow or buy audio equipment, you can still enjoy altering sampled sounds garnered from the public domain.

SoundShop, from Revolution Software, a sound editing program, won't help you record real-world sounds, but it will let you synthesize, alter and manipulate sounds from disk files and put together four-part songs. (The disk also holds BobShop, an animated sequence creator and editing program for blitter objects.) SoundShop offers easily twice the sample-editing power of the software that comes with the sampling devices mentioned here. Not only does it have the popular cutting, combining and looping stuff, it lets you change individual overtones, add sine waves and fade portions of up to four sampled or created sounds displayed graphically on-screen at once, making most changes while any or all are playing. It saves edited sounds in IFF file format, and the disk includes a SMUS-compatible four-track music composition program (500-note maximum per voice) in nonstandard music notation, with editing. The manual is the best of the bunch.□

edge in their single-card expansion slot on the right side of the Amiga. It comes with a very brief instruction manual and six (!) disks, five of which contain over 200K of samples. Separate RCA jacks at the back of the unit connect channels 1 and 2, which provide true stereo input from either line-level or amplified sources. Samples can be recorded from eight to 18kHz (at maximum, for a duration of 16 seconds with a 512K Amiga), but editing features are limited to adjusting the playback rate, cutting portions from the beginning and end and some filtering of noise. The documentation is directed at developers. It covers installation, IFF file formats and C-language subroutines for making and playing monophonic samples from chip RAM. Again, I was assured that the unit and software will function with expansion RAM, but since both RAM boards I have, like this sampler, connect to the expansion bus and do not have pass-throughs, I am not able to verify it.

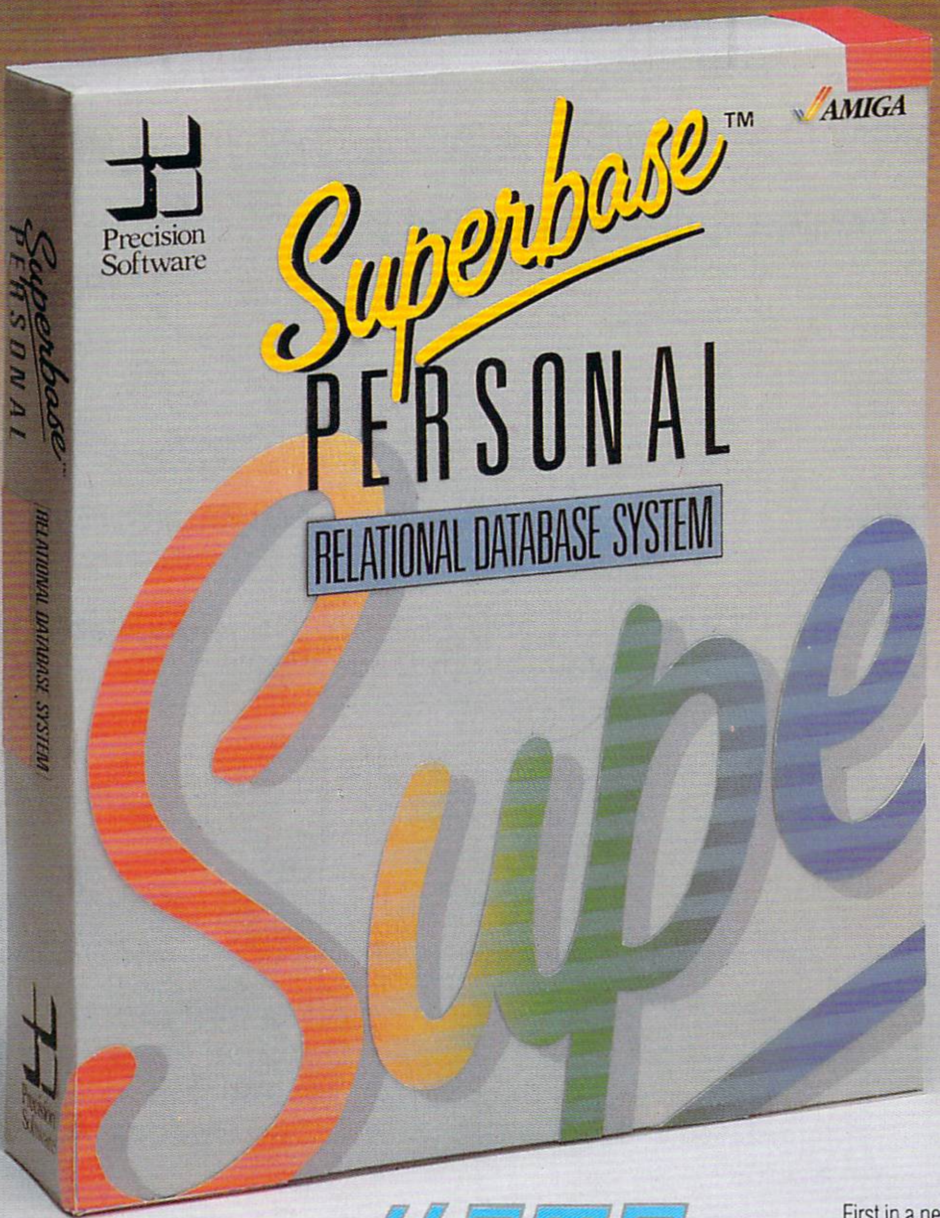
SoundScape's Sound Sampler connects to the second mouse/joystick port and is about the size of a pack of cigarettes. It fits flush against the Amiga and has three audio input jacks: one for microphone (not included), and two for stereo patch cords. The unit mixes inputs into a monaural signal, however thereby defeating stereo output. Sampling rate is fixed at 18kHz per second (for up to 18 seconds in a 512K machine), but since companding is utilized (see below), samples made with it are of superior quality. While adequate, the instruction manual is nothing to write home about. The program disk has two programs, one for recording parts of songs and sound effects and the other for making and editing musical instrument-type samples. The latter is a portion of Mimetics' SoundScape ProMIDI Studio ($149) music-sequencing software (a major sampling program upgrade is to be provided free to registered owners) and offers editing of one sample at a time with looping and/or applying a 3-stage, 4-level amplitude envelope, although samples thus altered cannot be saved in IFF file format (only in Mimetics' format). Samples can be played on a MIDI-connected keyboard with pitch wheel and velocity sensitivity under program control, and the software takes full advantage of expansion RAM memory.

Garbage In, Garbage Out

The overall quality of a sample is affected greatly by the clarity of the input signal. If you sample a noisy signal from an old tape deck, you'll get a distracting hiss from the Amiga. And get ready for a lot of buzzwords. It's true that the rate at which a sound is sampled must be twice the highest frequency in that sound including overtones, but if someone remarks that the human hearing range goes to 20kHz while the Amiga's maximum sampling rate is 28kHz, remind them that almost nobody over 30 can hear anything above 15kHz anyway. Should someone try to dazzle you with quantization, mention that that's dependent on the accuracy of the digitization method used by the sampler as opposed to the Amiga, and inquire politely how much sampling devices for *their* computer cost. Few machines have built-in digital-to-analog converters, and you can probably buy at least two Amiga samplers for that amount, giving you two methods of quantization and sample editing programs at your disposal.

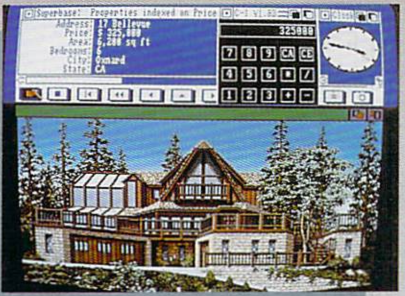
You can turn the tables on them by mentioning that these samplers and upgrades to their software work with expansion memory, and that although sound and graphics data must reside in chip memory, the Amiga is expandable to 8-megabytes of addressable RAM for program instructions. Mention, too, IFF compatibility between brands of programs. My tests were far from conclusive, but in general, I found that most samples of 32K or less were playable in Electronic Arts' Instant Music and DeluxeVideo, and some in a prerelease of the long-awaited Musicraft. As sampling becomes more popular, the IFF standard is sure to be expanded to full compatibility.

Should all else fail, invite them over to listen to some samples. Although the Amiga uses 8-bit resolution, it can do companding, a technique that produces a signal-to-noise ratio (program material compared to background hiss) of 70dB rather than the usual 48dB from similar systems, which makes it capable of the 14-bit sound quality of a compact-disc player. *That* should fool somebody's ears! ■


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Circle 26 on Reader Service card.

The *AmigaWorld* New Year's Hardware Buyer's Guide

Compiled by Bob Ryan and Vinoy Laughner

Hardware products you can use to enhance your Amiga system.

Third-party hardware for the Amiga has been slower in coming than software, mainly because it took longer for Commodore-Amiga to settle on a standard for hardware expansion. Now that the 100-pin, auto-configuration expansion specification has been established (and incorporated into version 1.2 of the operating system), expansion products for the Amiga are showing up on dealer's shelves. The products listed in this guide are those that we had information about on October 1, 1986.

The Hardware Guide is divided into eight sections: The two largest reflect the two primary ways you can expand your Amiga. *Chassis and Expansion Boards* lists the products that expand your Amiga via expansion slots provided by a standard expansion chassis. *Hard-Disk Drives and Stand-Alone Memory Boards* lists products that don't go into slots. Rather, products in this category come complete with their own cases and power supplies (if needed). Expanding your Amiga with an expansion chassis and boards is usually more expensive than buying stand-alone boxes, but it is also more flexible. In addition, hardware developers report that it is nearly impossible to daisy-chain more than two expansion devices on the expansion bus; you can attach many more devices to your Amiga if you use a multiple-slot

Chassis and Expansion Boards

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
aMEGA Box	C Ltd.	Chassis	Bus	$599	Dec 1
aMEGA 2	C Ltd.	Memory	Chassis	$449	Dec 1
AM100	Ameristar	Memory	Chassis	$799	Oct 15
ComboBoard	ASDG	Multfunc.	Chassis	NA	Nov 1
Convertible .5M	ASDG	Memory	Chassis	$450	Oct 1
Convertible 1M	ASDG	Memory	Chassis	$650	Oct 1
Convertible 2M	ASDG	Memory	Chassis	$900	Oct 1
Expan. Sys. 100	Ameristar	Chassis	Bus	$699	Oct 15
Extender Board	Ameristar	Board	Chassis	$49	Now
Mini-Rack	ASDG	Chassis	Bus	$500#	Nov 1
Mini-Rack B	ASDG	Chassis	Bus	$300#	Oct 1
Multi. Module	Microbotics	Multfunc.	Starboard	$99.95	Nov 1
PAL	Byte by Byte	Chassis	Bus	$1795*	Now
PAL-20	Byte by Byte	Chassis	Bus	$3195*	Now
PAL-42	Byte by Byte	Chassis	Bus	$3995*	Now
Parity Board	Byte by Byte	Memory	PAL	$300*	Now
PiggyBack	RS Data Sys	Memory	PowRCard	$299.95	Now
Prototype Board	Byte by Byte	Board	Chassis	$63*	Now
RAM-EXP-1	Techni Soft	Memory	RAM-BOard	$299.95	Now
SCSI Interface	CSA	Interface	Chassis	$695	Dec 1
ST 506 Controller	Ameristar	Interface	Chassis	$399	Oct 15
Turbo Amiga	CSA	Chassis	Bus	$5475	Dec 1
Turbo Chassis	CSA	Chassis	Bus	$895	Now
Universal Prototyping	Ameristar	Board	Chassis	$49	Now
Upper Deck	Microbotics	Memory	Starboard	$99.95	Nov 1
2Mbyte RAM	Byte by Byte	Memory	Chassis	$1195*	Oct 1
32-bit Memory	CSA	Memory	Chassis	$1800	Now

NA = information not available at press time
--- = not applicable
Opt = optional
= substantial discounts if purchased with a convertible memory board

* = subtract 20% from listed price if purchased direct from Byte by Byte
Ports
Bus = Amiga side expansion bus
parallel port

expansion chassis rather than stand-alone boxes.

The other categories list more specialized expansion products, although many of these use the expansion bus or an expansion chassis in the same way as the memory cards that predominate the two main sections. For each product in the guide, we've listed its type, the port it attaches to and the price. Where it applies, we've also listed whether the product is auto-config, whether it uses the 100-pin expansion specification, and whether it has a pass-through design, thereby allowing other products to plug into it and also use that port or bus. Finally, we've included a brief description of each product.

Don't base your purchasing decisions solely on this guide. The information here provides a good starting point for learning about products in your price range and area of interest; it does not, however, provide a complete picture of each product's capabilities and quality. In future issues of *AmigaWorld*, we'll provide more detailed reviews and comparisons of many of these products.

Although we tried to include information about every Amiga hardware product scheduled for release by January 1, 1987, we know that some of these products will probably be delayed and that, for one reason or another, we've missed others altogether. Look for information about additional hardware products for the Amiga in upcoming issues.□

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
Yes	Yes	Yes	6 slots, 150 watts
Yes	Yes	---	2Mbytes external memory, 0Mbyte board also available
Yes	Yes	---	2Mbytes external memory
Yes	Yes	---	Mix and match; 68881, IEEE 488, four serial ports
Yes	Yes	---	512K bytes external memory
Yes	Yes	---	1Mbyte external memory
Yes	Yes	---	2Mbytes external memory
Yes	Yes	No	5 slots, 135 watts continuous power
---	Yes	---	Extends slot out of chassis for prototyping boards
Yes	Yes	NA	3 slots, 9 amp power supply
Yes	Yes	NA	2 slots, 6 amp PS, may not work with all boards
Yes	---	---	Clock, 68881 socket, parity check hw, attaches to Starboard
Yes	Yes	Opt	5 expansion slots, 1Mbyte memory
Yes	Yes	Opt	PAL plus 20Mbyte DMA drive and controller
Yes	Yes	Opt	PAL plus 42.5Mbyte DMA drive and controller
---	---	---	*Provides 512K of parity memory for PAL; see PAL
Opt	---	Yes	0Mbyte memory, up to 4Mbytes; attaches to PowRCard
No	Yes	---	Naked expansion card for developers
Yes	---	---	2Mbytes memory, fits into RAM-BOard-1
Yes	Yes	---	Interface for hard disks, etc.
Yes	Yes	---	Controls 4 IBM-type disk drives; 2 floppy, 2 hard
Yes	Yes	No	Turbo Chassis, 68020, 32-bit memory, and 20Mbyte drive
Yes	Yes	No	5 expansion slots
No	Yes	---	Prototyping board, for Amiga expansion
Yes	---	---	Sockets for 1Mbyte memory, attaches to Starboard
Yes	Yes	---	2Mbytes external memory
Yes	Yes	---	512K, 32-bit static RAM for use with 68020

serial port
RGB = Amiga RGB port
Chassis = a slot in an expansion chassis off the expansion bus
#2 Mouse = second mouse port

Front = Amiga Front panel connector (for chip memory only)
Motherboard = Plugs directly into the Amiga motherboard
SCSI = requires separate SCSI interface in expansion slot
PAL, Starboard, RAM-BOard, etc. = works exclusively with these products

Hard-Disk Drives and Stand-Alone Memory Boxes

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
Alegra	Access Associates	Memory	Bus	$379	Now
aMEGA	C Ltd.	Memory	Bus	$549.95	Now
aMEGA 20	C Ltd.	Drive	Bus	$995	Dec 1
AX1000	Comspec	Memory	Bus	$729	Now
AX2000	Comspec	Memory	Bus	$899	Now
Business Partner	Micro Forge	Mem/Drive	Bus	NA	NA
Hard Disk System	Micro Forge	Drive	Bus	NA	NA
MASdrive 20	Microbotics	Drive	Parallel	$1495	Oct 15
PAL Jr	Byte by Byte	Mem/Drive	Bus	$1495	Nov 1
PowRCard	RS Data Sys	Memory	Bus	$599.95	Now
PowRCard	RS Data Sys	Memory	Bus	$799.95	Now
PowRCard	RS Data Sys	Memory	Bus	$1129.95	Now
PowRCard	RS Data Sys	Memory	Bus	$1399.95	Now
PowRCard	RS Data Sys	Memory	Bus	$1675.95	Now
RAM-BOard-1	Techni Soft	Memory	Bus	$499.95	Now
Starboard 2	Microbotics	Memory	Bus	$495	Nov 1
Tape Backup	Micro Forge	Tape	Bus	NA	NA
Twin Floppies	Micro Forge	Drive	Bus	NA	NA
1 Megabyte RAM	Academy Comp.	Memory	Bus	$399	Now
1.05Meg Memory	Skyles Electric W.	Memory	Bus	$699.95	Now
20 Mbyte Drive	CSA	Drive	SCSI	$895	Dec 1
2.15Meg Memory	Skyles Electric W.	Memory	Bus	$999.95	Nov 1

Clocks

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
A-Time	Akron Systems Dev	Clock	Parallel	$49.95	Now
Clock/Amiga	Skyles Electric W.	Clock	Bus	$69	Nov 1
Mousetime	Microbotics	Clock	#2 Mouse	$49.95	Nov 1
Tic	Byte by Byte	Clock	#2 Mouse	$59.95	Nov 1

Networks/ Connectors

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
Arcnet Board	Ameristar	Network	Chassis	$399	Now
Arcnet Box	Ameristar	Network	Bus	$499	Now
Ethernet Board	Byte by Byte	Network	Chassis	NA	Jan 1
Ethernet Board	Ameristar	Network	Chassis	$699	Now
Ethernet Box	Ameristar	Network	Bus	$749	Now
Proto 5K	ACDA	A/D Conv.	Bus	$275	Now
Proto 40K	ACDA	A/D Conv.	Bus	$1795	Now

Third-Party Chip Memory Modules

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
AM256	Ameristar	Memory	Front	$129	Now
256 Memory Expansion	Starpoint SW	Memory	Front	$99	Now
256K RAM Expansion	Microbotics	Memory	Front	$149.95	Now
256K RAM Expansion	Michigan SW	Memory	Front	$159	Now
262 Board	Skyles Electric W.	Memory	Front	$69.95	Now

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
Yes	---	No	512Kbytes memory
Yes	---	Yes	1Mbyte memory
Yes	---	Yes	20Mbyte SCSI drive and controller
Yes	---	Yes	1Mbyte memory
Yes	---	Yes	2Mbytes memory
NA	---	NA	1 or 2Mbytes memory + 10, 20 or 40Mbyte
NA	---	NA	1 or 2 hard drives; 10, 20, or 40 Mbytes
---	---	Yes	20Mbyte SCSI drive and controller
Yes	---	No	20Mbyte DMA drive and 1MB memory
Opt	---	Yes	0Mbyte memory, up to 4Mbytes
Opt	---	Yes	2Mbytes memory, up to 4Mbytes
Opt	---	Yes	4Mbytes memory
Opt	---	Yes	4Mbyte card + 2Mbyte Piggyback
Opt	---	Yes	4Mbyte card + 4Mbyte Piggyback
Yes	---	Yes	2Mbytes memory + slots for 3 RAM-EXP-1 boards
Yes	---	Yes	512Kbytes memory + sockets for another 512K
NA	---	NA	High-Speed tape backup for hard drives
NA	---	NA	two 5.25-inch floppy drives
Yes	---	No	1Mbyte memory; cheaper in kit form
Yes	---	Yes	1Mbyte memory
---	---	---	20Mbyte drive; plugs into SCSI interface
Yes	---	Yes	2Mbytes memory

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
---	---	Yes	clock/calendar with battery
NA	---	No	clock/calendar with battery
---	---	Yes	clock/calendar with battery
---	---	NA	clock/calendar with battery

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
Yes	Yes	---	Connects Amiga to Arcnet network
Yes	---	No	Side-mount version of Ameristar Arcnet board
Yes	Yes	---	Connects Amiga to Ethernet
Yes	Yes	---	10Mbits/sec; includes Cheapnet connector; NFS SW—$149
Yes	---	No	Side-mount version of Ameristar Ethernet board
No	---	Yes	Multichannel analog/digital converter
No	---	Yes	16-channel version of Prot 5

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
Yes	---	---	256K internal memory
Yes	---	---	256K internal memory
Yes	---	---	256K internal memory
Yes	---	---	256K internal memory
Yes	---	---	256K internal memory

Coprocessors

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
NCP Math Coproc	Netch	CoProc	Motherboard	$529	Now
Sidecar	Commodore	CoProc	Bus	NA	NA
68020 Board	CSA	CoProc	Chassis	$1480	Now

Sound Hardware

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
Digitizer	MicroGraphic	Digitizer	Parallel	$79.95	Now
FutureSound	Applied Vis	Digitizer	Parallel	$175	Now
MIDI For Amiga	Skyles Electric W.	MIDI	Serial	$49.95	Now
MIDI-Gold	Golden Hawk	MIDI	Serial	$79.95	Now
MIDI Interface	ECE R&D	MIDI	Serial	$59.95	Now
MIDI Interface	Mimetics	MIDI	Serial	$49	Now
Perfect Sound	Sun Rize	Digitizer	NA	$79.95	NA
Sound Sampler	Mimetics	Digitizer	#2 Mouse	$99	Now
Stereo Digitizer	Micro Forge	Digitizer	Bus	$349	Now

Video/ Graphics Hardware

NAME	COMPANY	TYPE	PORT	PRICE	AVAIL.
Amiga Genlock	Commodore	Sync	RGB	NA	Nov 1
Digi-View	New Tek	Digitizer	Parallel	$199.95	Now
EASYL	Anakin Research	Drawpad	Bus	$499	Now
Imprint	Liquid Light	Slide maker	Serial	$2495	Dec 1
Penmouse +	Kurta	Drawpad	Serial	$350	Now

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617/488-3602

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Piscataway, NJ 08854
201/540-9670

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3736 Bee Cave Road, Suite 3
Austin, TX 78746
512/328-2985

C Ltd.
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Wichita, KS 67211
316/267-6321

Commodore Business Machines
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West Chester, PA 19380
215/431-9100

Computer System Associates
7564 Trade St.
San Diego, CA 92121
619/581-0316

Comspec Communications
153 Bridgeland Ave., Unit 5
Toronto, Ontario
Canada M6A 2Y6
416/787-0617

ECE Research and Development
1651 N Monroe St.
Tallahassee, FL 32303
904/681-0786

Golden Hawk Technology
427-3 Amherst St., Suite 389
Nashua, NH 03063
603/882-7198

Kurta Corporation
4610 S. 35th St.
Phoenix, AZ 85030
602/276-5533

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
...	...	...	68010/68881 replaces Amiga's 68000
NA	...	NA	IBM PC/XT clone-in-a-box
Yes	Yes	...	68020, 68881, and 14MHz clock

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
...	...	No	Digitizes sound input
...	...	Yes	Digitizes from mike or audio system; mike included
...	...	NA	MIDI-In, 2 Outs, 1 Thru
...	...	NA	MIDI-In, 2 Outs, Sync
...	...	Yes	MIDI-In, Out, and Thru
...	...	NA	MIDI-In, Out, and Thru
...	...	NA	Stereo Digitizer
...	...	No	Digitizes inputs from mike or audio system
NA	...	No	Digitizes in stereo; requires $85 single-slot adapter

AUTO-CONFIG	100-PIN	PASS-THRU	DESCRIPTION
...	...	...	Synchronizes video source and Amiga video output
...	...	No	Digitizes pictures from video camera
Yes	...	Yes	Graphics tablet with optional animation pegs available
...	...	No	Polaroid Palette Image Recorder System + Amiga software
...	...	No	Graphics tablet with remote Stylus

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From Brushes to BOBs

Converting IFF graphics files to Blitter Objects for use in your Amiga Basic programs.

By Louis R. Wallace

Amiga Basic has a large number of support commands for animating objects, both sprites and BOBs. However, before you can animate an object, you must be able to create one. For that purpose there is an object editor included on your Amiga Basic disk. Unfortunately, it is not very powerful, since it is limited to only the Workbench resolution mode (four colors, 640 × 200). It has some simple drawing functions, but is only capable of very crude design. Since a good object editor has not been released commercially, the options are to make do with the one we have, write a new one, or wait. But there is another solution.

The Amiga absolutely excels at graphics, as shown in graphics-design packages such as DeluxePaint from Electronic Arts and Images from Aegis. These are extremely powerful graphics editors that work in several resolution modes. They both use the IFF file standard (developed by Electronic Arts and adopted by Commodore-Amiga), so pictures made with one can be used with the other. It occurred to me that there could be no better object editors than these two programs, so I began to investigate the possibilities of using DeluxePaint brushes and Images windows as BOBs (*B*litter *OB*jects).

My first discovery was that Amiga Basic does not use IFF standard forms for animation objects, simply because it was written before the EA standard was developed. When you use the standard Amiga Basic object editor, the files have a structure that is completely different from IFF. For one thing, the IFF header information, which is data that describes the file, is missing. Instead, there is some specific informa- ▶



ILLUSTRATION BY BLAIRE THORNLEY

tion about the object that Basic requires for its own use. Also, the data for the bitplanes are not interleaved, or mixed, as in IFF. It consists of contiguous data for each bitplane. IFF has the various bitplanes interleaved together based on the length of the object or screen in pixels. In addition, the IFF files may (or may not) be compressed data, which further complicates matters.

For graphics, IFF offers a very defined data structure. This allows different applications to read in only the areas of data that are of interest to them. For raster graphics, the IFF structure is called an Interleaved BitMap (ILBM).

Before we begin to look at this structure, it is necessary to define the terms we will be using. A *byte* is an 8-bit number (0–255). *Word* indicates a 16-bit number (0–65336). A *long word* is 32 bits wide (four bytes).

If you would like to examine an IFF graphics file, from CLI type:

TYPE *filename* OPT H

This will list the file in both hexidecimal and ASCII code, allowing you to examine its different parts. Table 1 contains an example of such a listing. It is the beginning of the DeluxePaint brush called WIZARD, found on the DeluxePaint disk. An explanation of DeluxePaint's brush format is given in Table 2.

The structure of the Amiga Basic BOB is much different, as mentioned. Briefly, it starts out with a long word indicating the coloroffset. It is usually zero. Next is the long word dataoffset, again zero. Then we have long words indicating the number of bitplanes, the object width and the object height. Then come three words (two bytes each) indicating information on object flags, planepick and planeonoff (always 0). Then comes the bitplane data, only here it is not interleaved. All the data for plane 1 comes first, then plane 2, etc.

While the file structure between brushes and Basic BOBs is very different, all the information needed for a BOB is contained in the IFF file. So I wrote a program (Listing 1, BRUSHTOBOB) that will read in the IFF file and write it back out as a BOB file usable from Amiga Basic. To use it, the brushes or windows you want to convert must be in the same directory as the Basic program. (Copy all the brushes and/or windows to your Basic work disk. Never write to the DeluxePaint disk; you will destroy its copy protection and the program itself. Images is not copy protected, so there is no problem with it.) Load Amiga Basic, and in direct mode, type CLEAR,100000. This will allocate 100K for Basic variables, enough for most brushes or windows. (The program uses large arrays to hold the data in memory.) Then load the BRUSHTOBOB program and run it. It will prompt you for the brush or window name and begin the process of creating your BOB. When it is complete, you will have a file on the disk with the same name as the brush, but the extension ".bbob" (Basic BOB) will be added to the end. You can then use the BOB in your own programs. As a simple example, Listing 2 will take any BOB that is 5 bitplanes (320 × 200 mode resolution) and move it across the screen. A small warning: While the Amiga can manipulate BOBs as large as the size of the screen, Basic only allows arrays up to 32,767 bytes long. A 320 × 200 five-bitplane BOB would be 40,000 bytes, so it cannot be used. However, by splitting it in half and using two BOBs, you could display whole screens as BOBs. Think of the possibilities of animated background displays, as well as regular BOBs and sprites!

This program opens up whole new areas of exotic graphics tools for the Basic programmer. DeluxePaint and Images have graphics tools for the artist unheard of before the Amiga. Now you can use that power to design complex and beautiful animations. ►

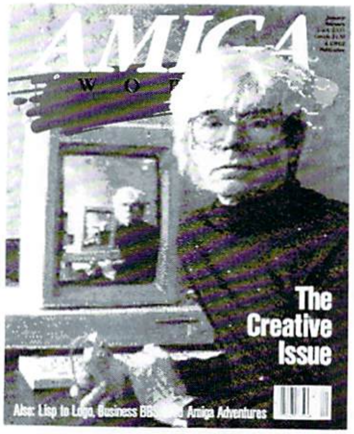
Address all author correspondence to Louis R. Wallace, 6124B SW11 Place, Gainesville, FL 32607.

Table 1. A hexidecimal/ASCII listing of an IFF graphics file.

0000:	464F524D	00000A24	494C424D	424D4844	FORM...$ILBMBMHD
0010:	00000014	0043003E	00000000	05020100	.....C.>........
0020:	00000A0B	014000C8	434D4150	00000060	.....@..CMAP...'
0030:	000000F0	F0F0D0D0	D0A0A0A0	80808050	...............P
0040:	50403030	30E00000	E04000F0	7010F0D0	P@000....@..p...
0050:	1000F000	00C00000	A0000070	00502000	............p.P.
0060:	703000A0	500000D0	7000C0D0	0090E000	p0..P...p.......
0070:	60E00030	E00020A0	6050F040	30B03020	'..0...'P.@0.0
0080:	80F07070	40404030	00000000	00F0A010	..pp@@@0........
0090:	47524142	00000004	0021001F	424F4459	GRAB.....!..BODY
00A0:	00000988	F700F700	F700F700	F700F700	....
00B0:	F700F700	F700F700	F700FC00	0080FD00	....

Table 2. A byte-by-byte explanation of WIZARD.

BYTES	FUNCTION/CONTENTS
00–03	Spells FORM, indicating an IFF file
04–07	Number representing number of bytes in file
08–0B	Indicates an Interleaved Bitmap file
0C–0F	Spells BMHD, indicating that Bitmap Header information follows
10–13	Represents number of bytes to the BMHD
14–15	Indicates width of the brush in the horizontal direction
16–17	Indicates depth of brush's scan lines
18–1B	Pixel position (ignore)
1C	Number of bitplanes (stores exponent of 2), here 2^5, or 32
1D	Mask flag, $02 indicates 'maskhastransparentcolor' (ignore)
1E	Compression flag, $01 indicates body is compressed
1F	$00, used for padding the ILBM BMHD file
20–21	$0000, a value for transparentcolor (ignore)
22–23	Pixel aspect values (ignore)
24–27	Screen resolution of this brush ($0140 = 320_{10}, $00C8 = 200_{10})
28–2B	Spells CMAP, indicating following data is the values for the color registers for the palette in use when it was saved
2C–2F	Number of color registers next (here, 32 × 3 for each color = 96)
30–8F	96 bytes for color registers
90–93	Spells GRAB, marking location of the handle of the brush
94–9B	Value for the handle of the brush
9C–9F	Spells BODY and marks beginning of the bitplane, or image data
A0–A3	Indicates size of the body (here, $988 = 2440_{10})



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	3½" DS/DD....	1.55 ea	1.50 ea	1.45 ea

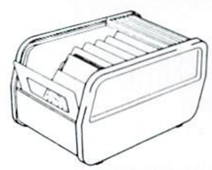
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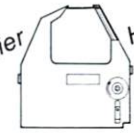
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Listing 1. BRUSHTOBOB program.

```
'Convert DeluxePaint brushes & Images windows
'    to bob files compatible with Amigabasic.
'    Also saves a file for color.
'    July 1, 1986
'    by Louis R. Wallace
DIM red(32),green(32),blue(32)
saveback=8          ' flags
overlay=16          '
savebob=32          '
flags=saveback+overlay+fVSprite
  'ask for brush file name
INPUT "What is the brush's name";filename$
OPEN filename$ FOR INPUT AS #1
  'get word FORM
a$=INPUT$(4,1)
  'find number of bytes in file called filename$
nbytes=CVL(INPUT$(4,1))
bodysize=nbytes-151
  'get unneeded bytes
a$=INPUT$(12,1)
  ' bobwidth in pixels
bobwidth=CVI(INPUT$(2,1))
  ' bobheight in pixels
bobheight=CVI(INPUT$(2,1))
  ' get unneeded bytes
a$=INPUT$(4,1)
  ' number of bitplanes in image
np = ASC(INPUT$(1,1))
planepick=2^np-1
    ' mask flag
mask = ASC(INPUT$(1,1))
nwords=bobwidth/8
IF INT(nwords)<(nwords) THEN nwords=INT(nwords)+1
IF ((INT(nwords/2))*2)<>nwords THEN nwords=nwords+1
nwperplane=nwords*np
totalnum=nwperplane*bobheight
DIM newarray(totalnum+1)
DIM bobarray(totalnum+1)
    ' compress flag
compress = ASC(INPUT$(1,1))
    ' get pad byte
a$=INPUT$(1,1)
    ' gettransparent color flag
transparent=CVI(INPUT$(2,1))
    ' get aspect ratios
a$=INPUT$(2,1)
    ' width of screen
screenwidth = CVI(INPUT$(2,1))
    ' height of screen
screenheight = CVI(INPUT$(2,1))
a$=INPUT$(4,1)
    ' get number of colors
numberofcolors=CVL(INPUT$(4,1))/3
    ' get colors for pallete
FOR i= 0 TO (numberofcolors)-1
    red(i)=ASC(INPUT$(1,1))
    green(i)=ASC(INPUT$(1,1))
    blue(i)=ASC(INPUT$(1,1))
NEXT i
    ' look for word "body"
WHILE a$<>"BODY"
      a$=INPUT$(4,1)
WEND
  'get size of body data
a$=INPUT$(4,1)
count=0
PRINT:PRINT "Reading brush bitplanes ..."
PRINT "Each dot is 100 bytes read in."
    ' get data from bob body into array
COLOR 3
WHILE NOT EOF(1)
      a$=INPUT$ (1,1)
      bobarray(count)=ASC(a$)
      count=count+1
      sum=sum+1
      IF sum=100 THEN
          sum=0:PRINT ".";
          ck=ck+1
          IF ck=20 THEN ck=0:PRINT
      END IF
WEND
CLOSE #1
COLOR 1
PRINT:COLOR 2:PRINT
PRINT  "Data for brush called ";
COLOR 3:PRINT  filename$;
COLOR 2:PRINT  " is:"
PRINT:COLOR 1
PRINT  "bobwidth=";:COLOR 3:PRINT  bobwidth
COLOR 1:PRINT  "bobheight=";:COLOR 3:PRINT  bobheight
COLOR 1:PRINT  "nplane=";:COLOR 3:PRINT  np
COLOR 1:PRINT  "mask=";:COLOR 3:PRINT  mask
COLOR 1:PRINT  "compress=";:COLOR 3:PRINT  compress
COLOR 1:PRINT  "screenwidth=";:COLOR 3:PRINT  screenwidth
COLOR 1:PRINT  "screenheight=";:COLOR 3:PRINT  screenheight
COLOR 1:PRINT
savebob:
bobname$=filename$+".bbob"
OPEN bobname$ FOR OUTPUT AS 1
PRINT#1, MKL$(0);                        ' colorset
PRINT#1, MKL$(0);                        ' dataset
PRINT#1, MKI$(0);MKI$(np);              ' depth
PRINT#1, MKI$(0);MKI$(bobwidth);       ' bob width in x
PRINT#1, MKI$(0);MKI$(bobheight);     ' bob height in y
PRINT#1, MKI$(flags);                   ' flags that have been set
PRINT#1, MKI$(planepick);              ' planepick
PRINT#1, MKI$(0);                        ' planeOnOff


IF compress=0 THEN
    GOSUB nocompression
ELSEIF compress>0 THEN
    GOSUB yescompression
END IF
GOSUB decodebrush
CLOSE#1
PRINT
OPEN filename$+".palette" FOR OUTPUT AS 1
FOR i=0 TO (2^np)-1
    PRINT#1,CHR$(red(i));
    PRINT#1,CHR$(green(i));
    PRINT#1,CHR$(blue(i));
NEXT i
CLOSE#1
PRINT  "Your brush has been saved as a bob called ";
COLOR 3:PRINT  filename$;".bbob";
COLOR 1:PRINT  "."
PRINT "It's color palette was saved as ";
COLOR 3:PRINT  filename$;".palette";
COLOR 1:PRINT "."
END


nocompression:
 COLOR 2:PRINT "Examining data in memory..."
 COLOR 1
 IF (INT(count/2)*2)<>count THEN count=count+1
 FOR i=0 TO count-1
     newarray(i)=bobarray(i)
 NEXT i
 RETURN


yescompression:
COLOR 2
PRINT "Decompressing data..."
COLOR 1
 index1=0
 index2=0
```

```
IF (INT(count/2)*2)<>count THEN count=count+1
WHILE index1<count
   VALUE=bobarray(index1)
   IF VALUE <128 THEN
      FOR kk=1 TO VALUE+1
         index1=index1+1
         newarray(index2)=bobarray(index1)
         index2=index2+1
      NEXT kk
   ELSEIF VALUE>128 THEN
      index1=index1+1
      anothervalue=bobarray(index1)
      FOR kk=1 TO (257-VALUE)
         newarray(index2)=anothervalue
         index2=index2+1
      NEXT kk
   END IF
   index1=index1+1
WEND
RETURN

decodebrush:
COLOR 2
PRINT "Decoding bitplanes..."
COLOR 1
counter=0
FOR k=0 TO np-1
PRINT "Plane ";:COLOR 3:PRINT k+1:COLOR 1
 uplim=(totalnum-nwperplane+k*nwords)
   FOR i=(k*nwords) TO uplim STEP nwperplane
      FOR j=0 TO nwords-1
         a$=CHR$(newarray(j+i))
         PRINT#1,a$;
      NEXT j
   NEXT i
NEXT k
RETURN
```

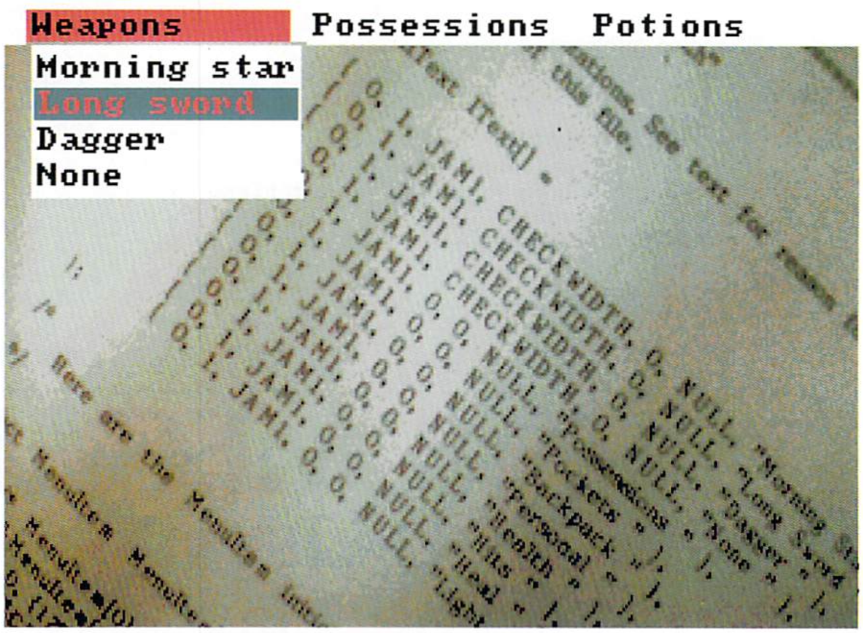
Listing 2. Basic program to animate BOBs.

```
' a generic 5 plane 320X200 bobmover
' requires files created by brushtobob
b$="ogre2"
pn$=b$+".palette"
file$=b$+".bbob"
SCREEN 4,316,200,5,1
WINDOW 2,"Custom 5 bitplane screen",,15,4
OPEN pn$ FOR INPUT AS 1
  FOR i=0 TO 31
      red!=ASC(INPUT$(1,1))/240
      green!=ASC(INPUT$(1,1))/240
      blue!=ASC(INPUT$(1,1))/240
      PALETTE i,red!,green!,blue!
  NEXT i
CLOSE 1
OPEN file$ FOR INPUT AS 1
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
OBJECT.X 1,1
OBJECT.Y 1,50
begin:
OBJECT.ON
OBJECT.START
FOR i=1 TO 10
    FOR x=0 TO 319
        OBJECT.X 1,x
        FOR delay=0 TO 50:NEXT
    NEXT:CLS
NEXT
OBJECT.OFF
WINDOW CLOSE 2
END
```

Creating Menus with Intuition

For those serious about programming the Amiga's visual interface, here's a tutorial on programming Intuition with C.

By Vincent M. Hopson



Intuition is a flexible and powerful menu driver for the Amiga. It allows the programmer to concentrate on his program without having to write menu primitives. Intuition is also beneficial to the user since a consistent format for mouse and menu use can be maintained regardless of the program. This article will show you how to program menus with Intuition. All you need to get started is a copy of C or an assembler, and an example.

Anyone who is serious about programming the Amiga should have the *Amiga Intuition Reference Manual* and the *Amiga Programmer's Handbook*. I used both of these documents extensively in the preparation of the example program. If you cannot get a copy of the *Amiga Intuition Reference Manual* locally, call Addison-Wesley directly (see number at end of article). The *Amiga Programmer's Handbook* is published by Sybex and is available at many computer bookstores.

The first tasks in programming are to figure out exactly what the program is going to do and how it will do it. Then comes the monumental task of information flow to and from the user. This is where Intuition makes the job easier. Menus allow the programmer to functionally group activities or information-gathering utilities to control program flow. Since Intuition also allows the programmer to specify substitute keystrokes for mouse activities, the menus do not become cumbersome for the adept. Instead of moving from the keyboard to the mouse and back to the keyboard, the user can elect to use the keyboard exclusively.

Menu Test Driver Program

Listing 1 is a driver program that can be used to test menustrips. It was written with Lattice C. Anyone using assembly language should be able to convert it easily. Comment out the "SetMenuStrip" and "extern struct Menu *MyMenu" lines before you initially attempt to compile it. The menu structures in the example must be created before using these lines.

This short program initializes the NewScreen and NewWindow structures, opens the necessary libraries in the Kernel and submits the menustrip for display. Any unnecessary gadgets (e.g., windowdrag, sizing and layers) can be removed from the window by taking their definitions out of the NewWindow structure flags and recompiling the program. This routine relies on CloseGadget to return control to the Command Line Interpreter (CLI); therefore, it should always be declared. All of the other flags dealing with the Intuition Direct Communication Message Port (IDCMP) are optional.

Once all of the structures are opened, the menustrip set and the appropriate pointers returned, this program enters a continuous loop and waits on the IDCMP for a message from either menu selections or CloseGadget. A CloseGadget message causes the loop to terminate, the menustrip to be cleared, and control to be returned to the CLI. MenuMessages (or IntuiMessages) cause the window to display the menu, item and subitem numbers. Note in particular how the message macros are used to extract menu-number information.

Unused fields in the IntuiMessage are set to their ►

ILLUSTRATED BY ROGER GOODE

maximum value. If the right-mouse button (menu button) in clicked without selecting any items, a Null IntuiMessage is sent by Intuition. All fields of this type of message are unused. This feature allows you to keep track of menu usage, but a check must be made on every IntuiMessage to ensure its validity. A definition is provided for you in the Intuition header file called MENUNULL. The driver program uses it to check all messages in the wait loop.

Notice that the menustrip structures are not in the program, but their head is declared as external. Once this program is compiled into a .o file, it is no longer necessary to recompile it to submit a revised menustrip; the strip is added during linking. Iterative attempts will be faster since only the menustrip initializations need to be recompiled.

When this program is executed, a screen titled *Menu Test Screen,* a window titled *Menu Test Window* and a *Hello* message will appear. When the right-mouse button is clicked, the Menu Test Screen title will be replaced by a blank title bar. This is where the menu selections that we design will appear. Familiarize yourself with the operation of the program, then click the left-mouse button (the select button) over the CloseGadget to return to the CLI. Now, on to Intuition!

Intuition Structures

Intuition uses several basic structures for development of a menustrip: Menu, MenuItem, Intuitext and Image. The Menu structure defines where on the title bar whatever text you wish to display as choices will appear. MenuItems may be textual or image (hence the last two structures) and appear whenever a menu choice is selected. Intuitext and Image structures define the imagery of the MenuItem—text or custom image, respectively. Currently, Intuition will display imagery in the MenuItems, but text only in the Menus.

Menu structures point to the next menu of the strip, and to the head of a linked list of MenuItems. MenuItems point to other MenuItems and subitems. None of the structures have any pointers to previous items, and thus form a *unidirectional* linked list. This makes troubleshooting the structure somewhat easier, since consistency is simpler to check in a one-way list.

Before working on the example, there are a couple of things worthy of note here. A good indication that you have made an error in the menustrip definitions can be seen in the length of time it takes for the mouse to become movable when the screen appears. After doing several menus that incorporate large menu structures, with many items and subitems, the delay should still be very short. Delays of a second or two is a bad indication. The message "Hello" will appear at the same time the mouse activates.

Another important observation is that the MenuItem structure outlined on page 134 in the *Amiga Intuition Reference Manual* is incorrect. After the ItemFill field definition, SelectFill should appear. It is a field defined by APTR, just as with ItemFill. A paragraph outlining the use of this field appears on page 135 in the text. If you create an initialization structure, and forget this field when you insert your definition for a subitem,

Lattice C gives you errors 20 and 67 for that line. (Neither of these errors is very descriptive of the problem.) Don't rely on the compiler to find your mistakes—be careful!

Now, let's create a menustrip with items and subitems. We will then create the structures required and test the result. Imagery may be created by not inserting the text flag (ITEMTEXT) in the MenuItem flags, and defining the Image structure. The ItemFill field will then point to your Image structure and not IntuiText. Whichever type of item field you desire, be sure to cast the value you use with (APTR) to suppress compiler warnings.

Creation of an Example Menu

This menu design example will be for one window of an adventure game. Our character needs to be able to change his weapon, take inventory of his pack, or use any available magic. We will call these topics Weapons, Inventory and Magicks. To avoid creating many individual names for each of the structures, I decided to use arrays of structures. Therefore, numbering of the structures should be started at zero. If we tabulate the titles (Menus) and each action or function associated with them (MenuItems), we can make an outline of the menustrip. I filled each Menu with a few appropriate items.

```
Menu[0]: Weapons

  MenuItem[0]: Morning Star
  MenuItem[1]: Long Sword
  MenuItem[2]: Dagger
  MenuItem[3]: None

Menu[1]: Inventory

  MenuItem[4]: Possessions
    MenuItem[5]: Pockets
    MenuItem[6]: Backpack
  MenuItem[7]: Personal
    MenuItem[8]: Health
    MenuItem[9]: Hits

Menu[2]: Magicks

  MenuItem[10]: Heal
  MenuItem[11]: Light
```

I would place the above outline in a comment field at the beginning of the menustrip declarations. When updates are made to this file, the documentation will be less easily forgotten. Having this information close at hand should help avert errors in new declarations.

Menu[0] is an *attribute* type menu. If the player wishes to find out what type of weapon he is currently wielding, this menu must be selected. If the player wishes to change weapons, he merely selects the desired one, and releases the mouse menu button. Intuition provides a checkmark that we will use to show the user which weapon is currently in use. Exclusion flags are also automatically processed by Intuition. These flags ►

tell Intuition which items cannot be selected at the same time. We will say that a Morning Star and Long Sword cannot be wielded at the same time, but a dagger may be used with both of them, or by itself. Selection of the None item drops all weapons.

Inventory is strictly an *action* menu. When the user selects it, Possessions and Personal appear. When either of these is selected, the subitems are displayed. If the user selects a subitem, we would open a window and display the contents of—or status of—the selected subitem. Since we are only testing the menustrip here, the window will not appear; this must be done in the real driver program. Our driver will allow the user to select the subitems, and report the one which was selected.

Magicks is an action menu without subitems; the majority of the menustrips that I have created have been of this type. The declarations for it are simple, and are defined in Listing 2, a program for initializing the menustrip structures.

Menu Structure Initialization

As a personal note, I dislike using *extern* statements to do forward references (references to things that are declared later); therefore, I declare everything in reverse. IntuiText is declared first, followed by MenuItems and Menus.

MyMenu Menu pointer is declared last. This line may be removed from the initializer file when testing is complete. It merely provides a consistent name for the pointer to the head of a menustrip for the driver program. I felt that a standard name was a small price to pay to avoid recompilation of the main driver with each test iteration.

The Weapons section of the menustrip uses the Intuition-provided checkmark and keystroke substitution sequence. Menu[0] is the head definition. The first parameter points to the next menu in this strip. Four size values are then provided for Intuition: LeftEdge, TopEdge, Width and Height. TopEdge and Height are presently ignored, since the current version of Intuition does not allow imagery in a Menu structure.

LeftEdge determines where the select box will begin. It is defined in pixels from the left of the screen. Width specifies the size of the select box that is desired. It too is defined in pixels, but starts from LeftEdge and continues to the right. The rest of the initializer tells Intuition that this menu is selectable (MENUENABLED), the name string to be used in the select box, and gives it a pointer to the first item of the Menu.

If you wish the name to appear, but do not want to add any items, you will have to create a null MenuItem. Nulling the pointer to the first MenuItem structure of a menu will cause a software failure, and subsequent system crash. The null MenuItem is a structure with all of the parameters set to NULL. Intuition does not seem to care if the pointers to ItemFill or SelectFill are null, but completely loses its sanity when a Menu structure MenuItem pointer is nulled.

All of the other Menus follow the same reasoning as the Weapons structure. Each of the Menu structures points to its successor until the last, which is null. All of the Menu structures form a linked list, and each contains the head of a linked list of MenuItems.

It is a good idea to define all of the horizontal size fields (LeftEdge and Width) in macros that are dependent on the previous field's size and location. I did not do this since it would have required a substantial increase in the size of the initializer program. An example is outlined below:

```
#define INVENTORYLEFT
(WEAPONLEFT + WEAPONWIDTH + SPACE)
```

Macros make reordering a little more difficult, but introduction of new fields, or modification of the sizes of existing fields, will recalculate all other positions automatically.

MenuItem Structure Initialization

MenuItem structures define the attributes of the items that are selectable under each of the Menus. The first field points to another instance of a MenuItem structure (NULL if no other items follow). All of the size specifications are important in this structure since imagery is possible.

LeftEdge is defined in pixels from the left edge of the Menu select box. TopEdge is defined in pixels beneath the menu, starting with the last line of the titlebar. Width and Height are in pixels horizontally and vertically, respectively. These definitions are for the select box that you wish to allow for this item. Intuition will create a box to surround all of the items automatically, and cannot be controlled. The minimum width of the box generated will be the size of the select box defined in the Menu structure. A select box for each item may be any size you desire, but to maintain consistency within a menu, the width of all text MenuItem select boxes should be equal to the largest.

Please look at the structures defined as MenuItem[0] and MenuItem[1]. Notice that the TopEdge of MenuItem[1] starts at the height of MenuItem[0]. This will pack the text fields as closely together as possible and still appear neat. MenuItem[0] through MenuItem[3] show how to declare enough space for your text a checkmark (CHECKWIDTH) and command-key sequence symbols (COMMWIDTH). Normally, when computing text widths in pixels, multiplying the number of characters in the text by ten will yield a generous select box width.

The flags field of the MenuItem structure tells Intuition which services and attributes we desire. CHECKED says that this item is selected when the menustrip is submitted. CHECKIT indicates that selections have a checkmark that is generated and updated by Intuition. ITEMTEXT means the ItemFill field points to an IntuiText structure. Omission of the ITEMTEXT flag indicates that an Image structure is used. COMMSEQ alerts Intuition that keystroke substitution is possible for this selection. ITEMENABLED allows the user to select this MenuItem from the list. Without this flag, the image or text of this selection will appear ghosted, and be unselectable. Finally, HIGHCOMP tells Intuition to invert the values of the color registers when this item is selected. ITEMTEXT, ITEMENABLED and HIGH- ►

COMP are used in all of the initializers. CHECKIT and CHECKED are used for attributes.

Mutual Exclusion is the field that allows Intuition to intelligently update selections that have checkmarks. Each bit position of this long word variable (32 bits) represents the selections that must be turned off when this item is selected. The zero bit represents the first item, the one bit the second, etc. Obviously, only the first 32 item declarations of a single menu may be mutually excluded. MenuItem[0] (Morning Star) must exclude MenuItem[1] (Long Sword) and MenuItem[3] (None), per our previous discussion on weapons. Therefore, we must set bits 0 and 3, and set the mutual exclusion flags of MenuItem[0] to 0x0000000A. All of the leading zeros are actually unnecessary, and were omitted in the listing. MenuItem[3] mutually excludes itself, since None is not a wieldable item. The Weapons menu is the only area where these flags are useful.

The next line points to an instance of IntuiText (remember, we set the ITEMTEXT flag above) to represent this item. It is cast with APTR to suppress compiler warnings. Since we set the HIGHCOMP flag, the SelectFill field is unused, and is nulled to allow us to initialize the command-sequence value. This field holds a single letter that will represent this selection if the right Amiga key and this letter are pressed together. The command-sequence value will appear to the right of the graphic rendition of the right Amiga key in a MenuItem display. Letters that are chosen as command sequences will be caseless (e.g., S is equivalent to s). S was chosen for the Morning Star weapon because of difficulties with using M as a command-sequence letter. I could not get M to work, even when it was substituted into known working structures.

MenuItem[5] does not use checks or command sequences, but declares a subitem. The field after the command-sequence value is the pointer to another MenuItem structure that will be used as a subitem. All of the size parameters of the subitem are referenced to the same point as items. Subitem lists are exactly like items except that the head of their list is attached to a MenuItem structure instead of a Menu. Note that the select boxes of the item and subitem list must overlap somewhere. A system crash is possible if this rule is not observed.

IntuiText Structure Initialization

Intuitext structures are the simplest of the structures seen so far. They define all pertinent parameters for the placement of text into the window or item. FrontPen and BackPen define the foreground and background colors to be used in the rendering. Background color is unchanged with JAM1 set in DrawMode, but is used with JAM2. LeftEdge and TopEdge are specified in pixels from the left edge and top edge of the select box that will house the text.

TextAttr sets the font of the text to be used. When this field's value is NULL, the default text is used. The development and use of custom fonts is more explicitly defined in the *Rom Kernel Manuals*. The following field points to the actual text to be rendered in the custom or default font. From the example program it can be seen that the string pointer will be placed in the structure, and not the entire string; this is a normal C compiler operation, since C usually places strings into a separate initialized data area after compilation.

Summary

From the example, it should be obvious that an extensive menu may be easily created under Intuition. All of the work of checking and verifing selections and maintaining mouse data is taken care of for you. What impresses me the most about Intuition is its ease of use. Once I was familiar with menustrip creation, I could create complex menus quickly and relatively easily.

The program and example were written to assist any Amiga programmers who want to learn from my mistakes. The initial driver program was easy to write, but testing different versions of menustrips was tedious. I finally made the driver program accept an external menustrip label and linked menustrips to the driver. After many iterations with imaginary strips, I worked out some of the fine points of menustrip creation. I hope the information presented here will clear up some of the nebulous areas in creating menus as well as provide a useful tool for testing. □

[*Amiga Library reference manuals may be ordered directly from the Addison-Wesley Publishing Company, (617) 944-3700.*]

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Listing 1.

```
/***********************************************************
*
*   Menu Test Driver program.
*
************************************************************
*
*    These include files are for intuition, and intuitionbase.
*    "graphics/display.h" may be omitted unless you wish to
*    turn on the INTERLACE flag.  This flag will allow you
*    to display your screens in the Hi-resolution mode 640 x 400.
*
***********************************************************/

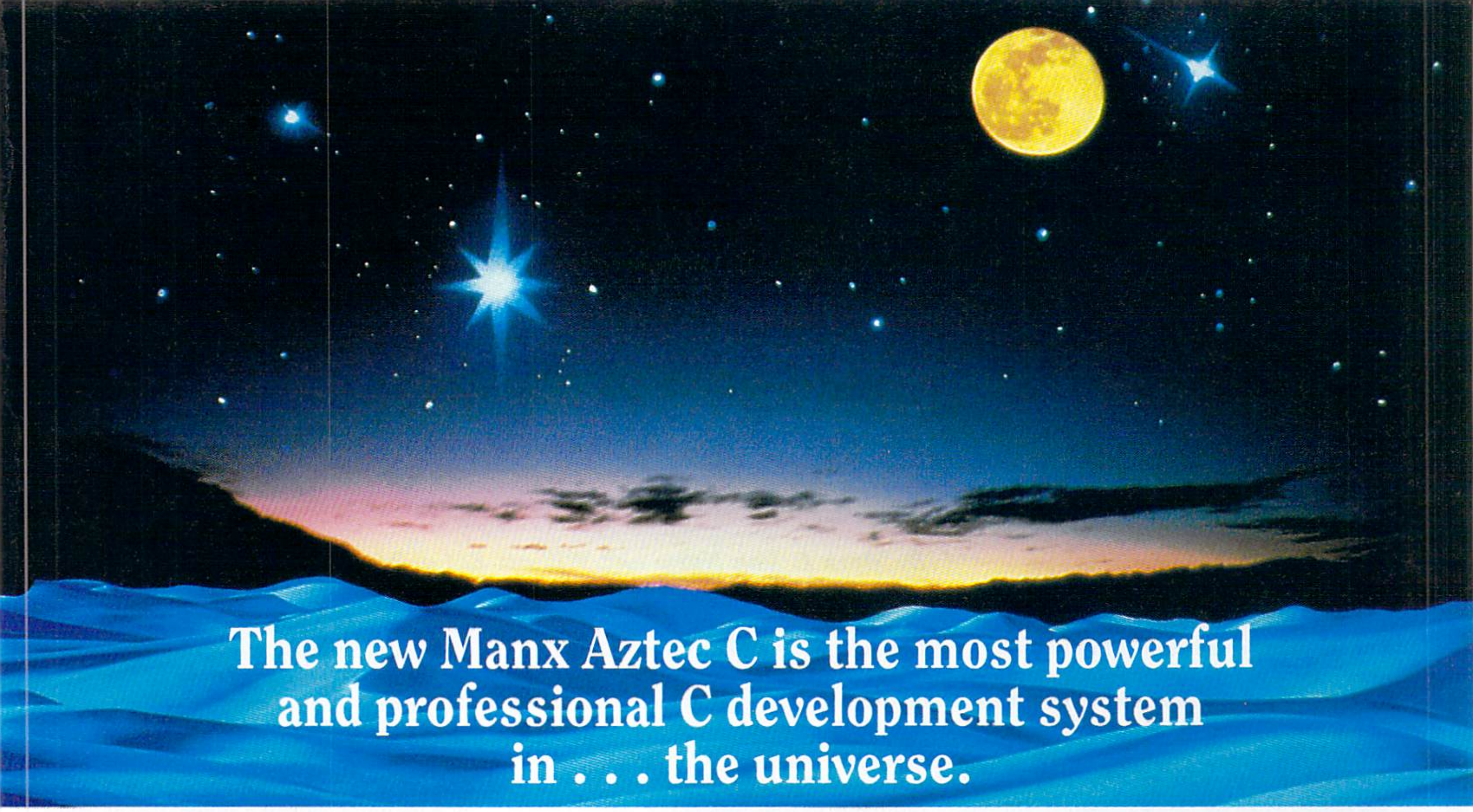
#include "exec/types.h"
#include "intuition/intuition.h"
#include "graphics/display.h"

/***********************************************************
*
* These structure pointers are used to access the
* Amiga libraries.  They provide a base entry
* point that will not vary through different
* versions of the Operating System (OS).
*
***********************************************************/

struct IntuitionBase *IntuitionBase;
struct GfxBase *GfxBase;

/***********************************************************
*
* The MenuStrip program must supply the following pointer
* to the first object in its menu.  This is to get a
* common name to submit to Intuition.
*
```

Listing continued on page 102



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Look What's New in 1.2

A look at version 1.2 of the Amiga's system software.

By Mark L. Van Name and William B. Catchings

Some software systems improve with age. Others stagnate or even degenerate over time. The shaky and bug-ridden first release (version 1.0) of the Amiga's system software and the better second release (1.1) were notable only for their promise of what might be. We are happy to report that, with the newest release (1.2), the Amiga's system software has come of age.

This is an exciting release. It rounds out the Amiga, improving it on nearly every front. We'll take a quick look at some of the most important features and discusss the new and changed AmigaDOS CLI commands. We'll discuss most of the changes to the Workbench interface itself in our next column. (Please note: The information in this column is based upon our examination of pre-release copies of Kickstart 1.2 and Workbench 1.2. Some of the specifics we list below could be different in the final release.)

A Quick Look Around

This release includes new Kickstart and Workbench disks. You should use them together, or be prepared for some things not to work correctly. The new software looks pretty much the same as it always did. This is deceptive. This version is much more stable than the previous ones because the Amiga developers have fixed many of the bugs in the system.

One thing you will soon notice is that this version is a great deal faster. Open the Workbench icon and you will be pleasantly surprised at how quickly its window appears and is filled. Disk access speed has improved dramatically. Icons and windows open quicker than before. CLI DIR commands feel almost snappy. These improvements extend to any kind of disk, including hard disks. Accessing a file on a hard disk with a hundred or more files using version 1.1 could take a minute or more. The Amiga developers have improved the way disk sectors are found and allocated, so now hard disks with many files behave reasonably.

If you have a little spare memory, you can improve your disk performance even more. A new CLI command, which we will discuss below, lets you cache disk sectors. A disk cache is memory in which recently accessed disk sectors are kept. The copy in memory is used rather than reading it from the disk on subsequent accesses. Since memory is much faster than a disk, the disk cache can mean substantial improvements in disk access time.

Unfortunately, you will have to spend some time getting your old disks into the new, faster format to take advantage of these performance improvements. The old format will work, but not as fast. You can change formats by using the CLI command COPY ALL to copy the files from an old disk to a new blank disk that has been initialized under AmiaDOS 1.2. Using the DISKCOPY command, or any of its Workbench equivalents, will give you an exact copy of your old disk, without the new format. The improved disk access speed is worth the conversion effort.

Besides improving the use of your old disk drives, this release lets you use different kinds of disks. In addition to entire hard disks, you can work with partitions of those disks and even with 5¼-inch drives, such as the Amiga 1020 drive. Assuming they come with the appropriate disk driver software, you can use 5¼-inch drives as limited-capacity Amiga drives. For those of us with the Transformer software or the Sidecar, this is a real bonus.

Though you could buy hard disks before this release, you had to follow unusual and often difficult installation procedures to get the disk and your Amiga to work together. This was also the case for most other system expansion options, such as memory beyond the first 512K. Version 1.2 makes this task much easier. You can make the connection to a hardware add-on a simple part of your Amiga's startup process. This is known as *automatic configuration* of your system. Devices that come with the software needed to connect to your Amiga in this way are commonly called *auto-config devices*. Most good Amiga options are either already auto-config or quickly will be. An auto-config add-on will come with a disk that contains a *device driver file*. This file is a program that the Amiga uses to work with that device. Copy that file into the new Expansion drawer on the Workbench disk to add the device. When you next boot your Amiga, you can access the new device as if it came with the system.

Another kind of "disk," the RAM: pseudo-disk, has also improved with this release. Its 30% data transfer speed improvement is very noticeable. If you run out of memory, it now gives sensible messages. Also, when you first use RAM: during a work session, an icon for it appears on the Workbench screen. Unfortunately, this icon stays even after you delete the last file from RAM:. To remove the icon you must reset your Amiga.

Version 1.2 also has some new features designed for the European user. Most important is the ability to change the characters produced by the keyboard. The characters printed on the keys are not the only ones that can show up on the screen. They only represent one possible interpretation, or *mapping*. This release offers alternate interpretations, or *key maps*. In the directory ►



Experience it!

Fourth and goal on the two. Ten seconds left and you're down by five. The roar of the crowd is deafening as you scan the defense. Something's not right. You call an audible...that special play you've been saving for a moment like this. You fake a hand off to the fullback up the middle and drop back to pass, but nobody's open. You roll left, pursued by a 270 pound defensive lineman. Finally, the fullback breaks clear in the end zone. You squeeze a bullet between two defenders as your fullback cuts back to make the catch. The scoreboard lights up as the crowd goes wild...TOUCHDOWN!!

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:devs/keymaps on the Workbench disk, there are maps for several other countries. There are new key maps for Germany, France, Great Britain and Italy. A new CLI command (discussed below) lets you pick the key map you wish to use. Typically, you pick a key map in your startup-sequence file, although you can change key maps at any time. You get only one key map for all the text in all windows, however.

The new maps support both the expected characters and any needed accent or other diacritical marks. To get a character with a special diacritical mark on your screen, hit first the key for that mark and then a normal character key. They appear on screen in a single character position, just as you would write them.

European Amiga users will find another pleasant feature in 1.2: support for the PAL television signal standard. Of course, you need the Amiga custom chip that supports PAL. If you have it, this release gives 256 horizontal display lines in the normal mode, and 512 lines with an interlaced display. It also refreshes the screen at the standard PAL rate, 50Hz. Finally, the Amiga's internal clock will no longer be messed up by 50Hz AC current. Instead, the system detects whether 50Hz or 60Hz current is being used, and updates its clock appropriately.

New CLI Commands

Version 1.2 offers new CLI commands to support some of the above features, as well as a few other useful new commands. Here we will first give each command's syntax and then discuss its function. We follow the same basic syntax conventions as the *Introduction to AmigaDOS* manual. The notation DF<i> is a shorthand way of saying that you may name any Amiga disk drive.

ADDBUFFERS DF<*i*>: <*nn*>

Earlier we mentioned that 1.2 allows you to devote spare memory to extra disk sector caches. This command assigns <*nn*> extra buffers, each containing 512 bytes, to the cache for the specified drive. You can use it in specific situations to improve performance, such as in a system command file for linking compiled routines. If you have enough memory, you can use it to increase the cache for your most frequently used drives in your startup-sequence file. We have found that an additional 32 buffers (16K of memory) significantly speeds up disk access.

BINDDRIVERS

You use this command primarily in your startup-sequence file. It is part of what you must do to add an auto-config hardware option to your Amiga. It causes the Amiga to make a part of the system all of the device drivers in the Workbench Expansion drawer. By putting device driver icons in the Expansion drawer and placing this command in your startup-sequence, you can make the software for your auto-config hardware additions a part of your Amiga system every time you boot.

DISKCHANGE DF<*i*>:

The Amiga automatically notices when a new diskette is placed into one of its standard drives. However, not all disk drives, such as the typical 5¼-inch drive, are capable of detecting when you change the disk. For AmigaDOS to keep working properly, you must use this command to tell it when you have changed disks in such drives. While clearly not as nice as automatic detection, this command is necessary for the ability to use other drives with the Amiga.

DISKDOCTOR DF<*i*>

Disks occasionally fail. Usually when this happens only a very small part of the disk is damaged, but nevertheless, you can't use the disk. To try to save such a disk, put it in a drive and issue this command. It will attempt to recover as much of the data on the disk as possible and will inform you of its results.

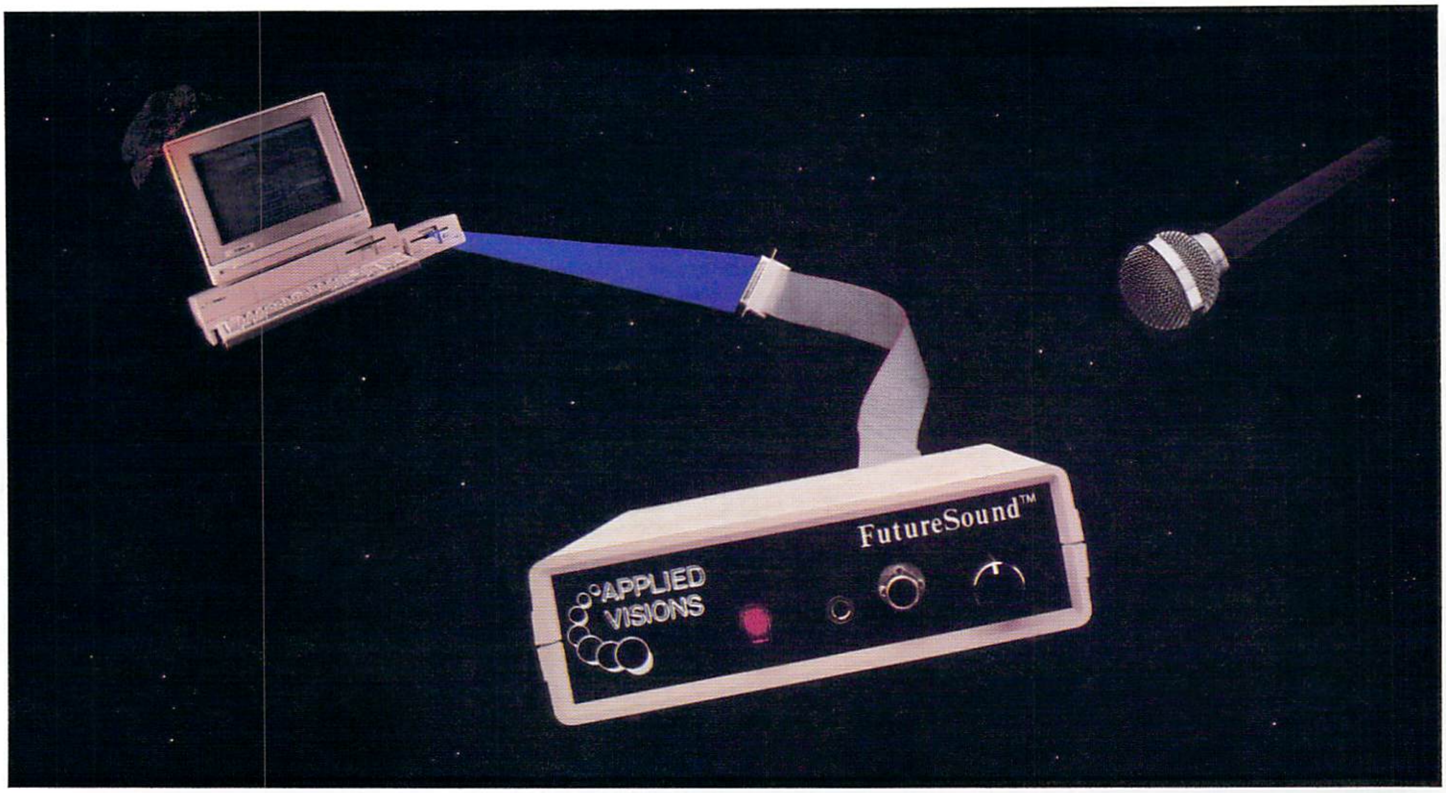
MOUNT <*device*>

We now know that to use an auto-config hardware option with your system, you first put its device driver in Expansion, and then use BINDDRIVERS to make that driver part of the system software. To tell the system to start using the device, issue this command. This is called *mounting* the device. For example, if you want df2: to become the 5¼-inch drive you bought with the Amiga Transformer, you type MOUNT DF2:. You also can mount devices other than disk drives.

There is one slight complication, however. For this command to work, the device you name must have an entry in the file *:devs/Mountlist* on the Workbench disk. This entry should be supplied to you by the manufacturer of the device. There is a sample entry in that file, but it does not show everything you need to know to mount a new device.

NOTEPAD [[[– Q] <*filename*>] | ?]

We tend to think of the Notepad as a simple Workbench tool. As we shall see in our next column, the Notepad has become a great deal more powerful. You now can use this command to run it from the CLI. The ▶



"Open the pod bay doors, HAL..."

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<filename> parameter specifies on which file to run the Notepad. If you add the –Q option, it will start up without reading any fonts from the disk, which will make it faster. As with most commands, if you supply a ? as its only parameter, you will be shown its syntax.

PATH [**SHOW** | <*dir_name*> [, <*dir_name*>] . . .] |
ADD <*dir_name*> [, <*dir_name*>] . . .]]

The PATH command is one of the new CLI commands that you will probably use frequently. Prior to this release, when you tried to execute a command or another program from the CLI, AmigaDOS looked for that program first in your current directory, and then in the directory assigned to C:. If it could not find it in either place, you would have to specify the program's full path name. An easier answer is to tell AmigaDOS to look in other directories. For example, you might want to copy some but not all of the commands from C: to RAM:, conserving memory by putting only the most common ones there. This command solves this problem.

You use it to establish a list of places that AmigaDOS should search when you try to run a command or other program. AmigaDOS will search the directories on the list in the order that they appear there. This list is often called a *search path*. The ability to tell AmigaDOS where to look for commands and other programs allows you to customize your system and to take advantage of even a small amount of spare memory for the RAM: pseudo-disk.

You define a search path by following PATH with a list of directories. This list replaces the previous search path. For example, to make AmigaDOS look first in the RAM: pseudo-disk and then in C:, you enter PATH RAM:, C:. You can add directories to the end of this list by using the key word ADD and a list of the additional directories. The key word can come at either the beginning or the end of the directory list. Thus, you tell AmigaDOS to check SYS:system after RAM: and C: in our example by using either PATH ADD SYS:system or PATH SYS:system ADD. If you want to see your current search path, type PATH SHOW. Finally, to return to the traditional defaults, enter PATH with no parameters.

SETMAP <*map_file*> | **USA**

This is the command you use to get alter- ►

nate key mappings so that you can enter the characters appropriate to other languages. The <*map_file*> you name must be a correct reference (e.g., full path name) to one of the key map files in *:devs/keymaps* on the Workbench disk. You also have the option of specifying USA. While not a file in that directory, USA tells the system to return to its default key mappings, which are stored in ROM.

SETTASKPRI <*priority*>

One of the Amiga's great features is its multitasking ability, allowing you to have several different jobs running at the same time. Until this release, however, all of the jobs started from the CLI had the same priority. This meant that each had an equal chance to run on the CPU. This is not always what you want. For example, you could have a C program compiling while you are editing text. You would probably want the compilation to run only when you are thinking or pausing and do not want it to get as much system attention as the editing task. Now you can give different tasks different priorities.

This command sets the priority of the CLI task from which it is issued. Further, any tasks started by this CLI will inherit this new priority. For example, you could use the CLI RUN command to EXECUTE a command file in the background. This file could contain a SETTASKPRI command that causes it to be a very low priority task, one that works only when little else is going on.

You need to be careful with this command. The system does not check to see if you supply a legitimate priority. You could pick a priority that is so high that it interferes with vital system functions. To avoid doing so, keep <*priority*> an integer in the range from −5 to +5.

Changed CLI Commands

In addition to giving us several new commands, version 1.2 offers improvements to a few of the existing ones.

CD and ASSIGN now provide full directory names when they give you information. This can help, for example, when you need to distinguish between several subdirectories in different places that have the same basic name.

In version 1.1, it was very difficult to stop the DIR command from displaying all of its output, even when you had already received the information you needed. Now, you can stop it at any time by typing CTRL-C, just as you can with other commands.

The FORMAT command also has been changed to accommodate any disk that has been mounted on your Amiga. It will work with hard disks, hard-disk partitions and 5¼-inch drives. Further, its behavior has been changed slightly. If you use the old syntax, it correctly formats a disk, but it does not leave that disk empty. Instead, it places on your disk a Trash icon (and, therefore, directory) like the one on the Workbench disk. While this is often useful or at least acceptable, you may also want a completely empty disk. If you do, add the word NOICONS to the end of the FORMAT command. This stops it from adding the Trash icon.

If you ever need to stop the FORMAT command before it has finished, you now can do so in either of two ways. First, enter CTRL-C. Second, if you are working on a 5¼-inch disk, simply remove it from the disk drive. While this normally could hurt any data on the disk, you lose nothing as an unformatted disk can contain no Amiga data.

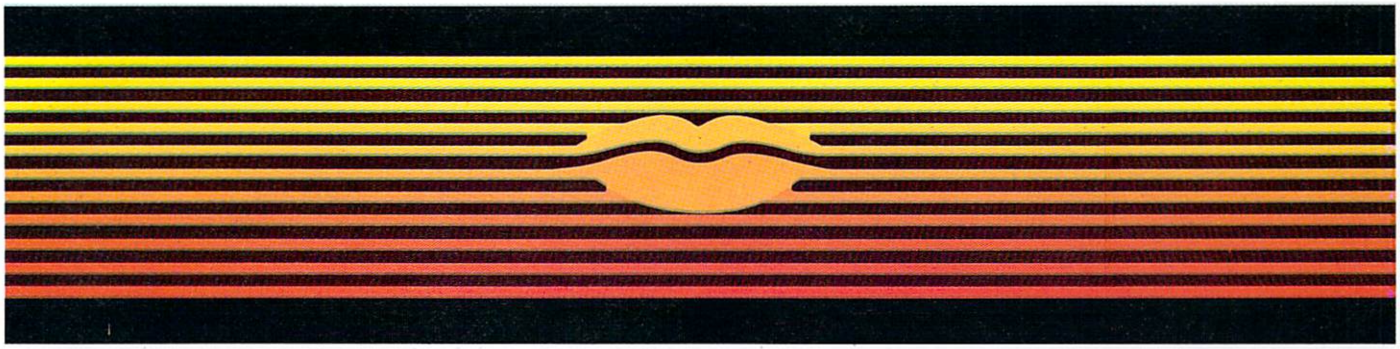
FORMAT is not the only command that has been changed to accommodate new types of disk drives. The DISKED and DISKCOPY commands now work with any drive that you have successfully added to your Amiga. Remember that to do so you must add its driver to the system software and you must MOUNT it on your system.

Finally, two other commands, EXECUTE and EDIT, have been improved. Both commands sometimes need one or more temporary files. These files are put in the directory assigned to T:. In the past, if there was no T: directory, neither would work correctly. Now, when one of them needs a T: directory and there is none, it creates one. This saves you the effort. However, it also means that such a directory may appear on your disks without you being aware of it.

Still More to Come

With just the above new features and commands, release 1.2 of the Amiga system software is an exciting new product. It improves performance, expands the range of devices you can add to your Amiga and the ease with which you can add them, better supports the European community, and offers new and improved CLI commands. Next time around, we will focus on improvements to the Workbench interface, including the Notepad and Preferences.■

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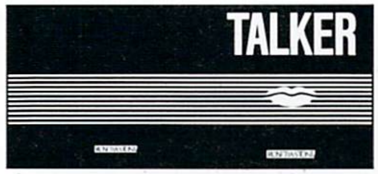
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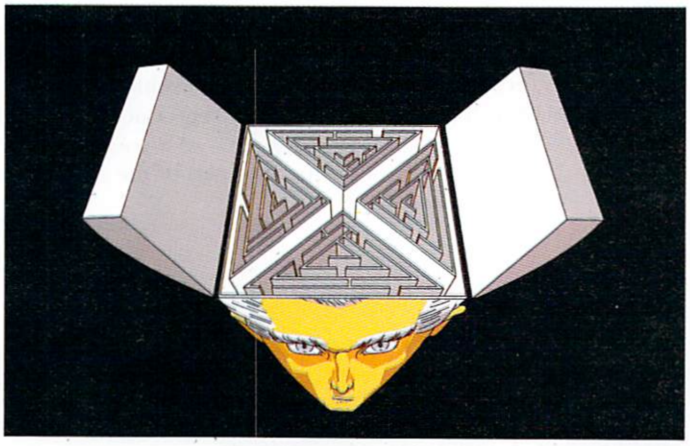
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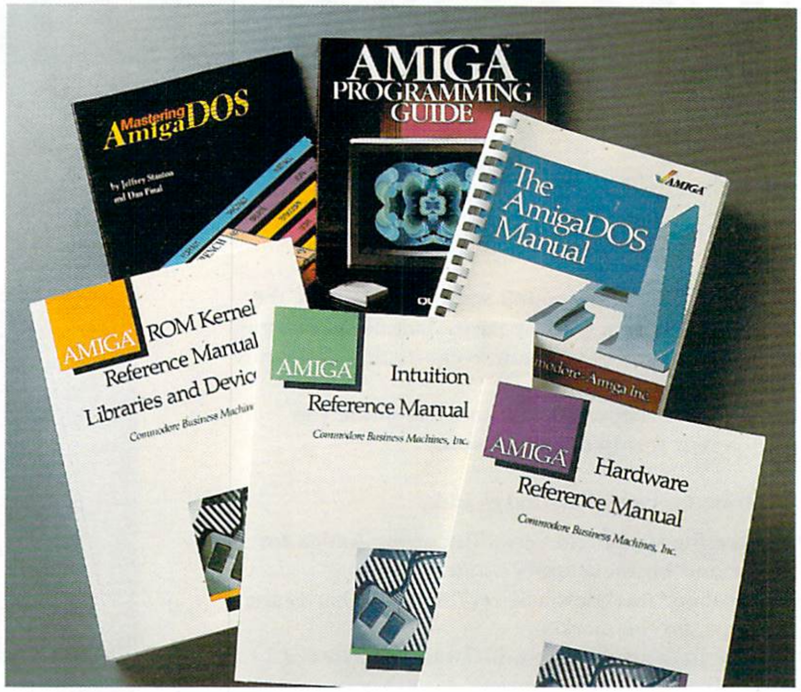


Amiga Book Roundup

By Louis R. Wallace

An extensive library of Amiga reference books already exists, and it is growing rapidly. If you want to get more out of your Amiga, pick up a title that interests you and dive in. You won't regret it.

In response to the need for more information on the Amiga, the major computer book publishers are producing a number of books specific to the needs of the Amiga user and programmer. In addition, many general books on the 68000 and programming in C are of great value to Amiga owners. Below is a list of currently available Amiga-specific books.



Introductory Texts

Amiga Applications by Brian Flynn (Compute! Books. $16.95) is a collection of 29 type-in programs that cover many different areas, such as games, education, science, business, math and general household applications. It could be used as a tutorial (by example only) on Basic programming as well as a source of programs.

The Amiga Handbook by Markus Breuer (distributed in the U.S. by Progressive Peripherals and Software. $24.95) is a detailed reference guide to the Amiga's hardware and software for beginners to advanced users. Workbench, Intuition and Multitasking are dissected and explained. It also has an extensive tutorial section.

The Amiga System: An Introduction by Bill Donald (distributed in the U.S. by Progressive Peripherals and Software. $15.95) is a general introduction to the Amiga aimed at beginners.

Beginner's Guide to the Amiga by Dan McNeill (Compute! Books. $16.95). This book covers the same sort of general information as the *Introduction to the Amiga*, but spends more time describing terminology that the *Introduction* assumes is already understood by the reader. It also devotes a great deal of attention to software in general, and gives specific examples for the Amiga. It is a very general introduction to the Amiga, not a programming guide.

Elementary Amiga Basic by C. Regena (Compute! Books. $14.95) is aimed at the beginning and intermediate Basic programmer. It covers a majority of the Amiga Basic commands and contains many example programs demonstrating programming techniques and Amiga Basic capabilities.

Kids and the Amiga by Dr. Edward Carlson (Compute! Books. $14.95) is a gentle introduction to programming in Amiga Basic, aimed at kids from eight to 80. Well illustrated, it starts with simple examples and ends with more advanced Basic techniques using many small programs as examples. It is very well suited to classroom instruction for beginners.

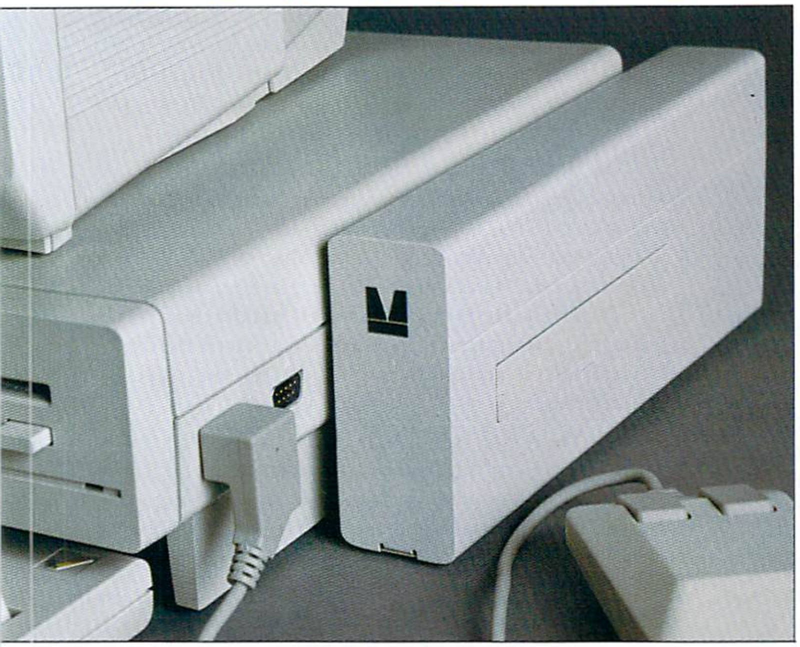
DOS Information

The AmigaDOS Manual (Bantam Computer Books. $24.95) is the commercially available version of the three AmigaDOS manuals suppied to registered Amiga developers. It includes the *AmigaDOS User's Manual*, the *AmigaDOS Technical Reference Manual* and the *AmigaDOS Developer's Manual*. It covers all aspects of AmigaDOS, ►

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FROM MICROBOTICS: SMALL THINGS WITH BIG MEMORIES

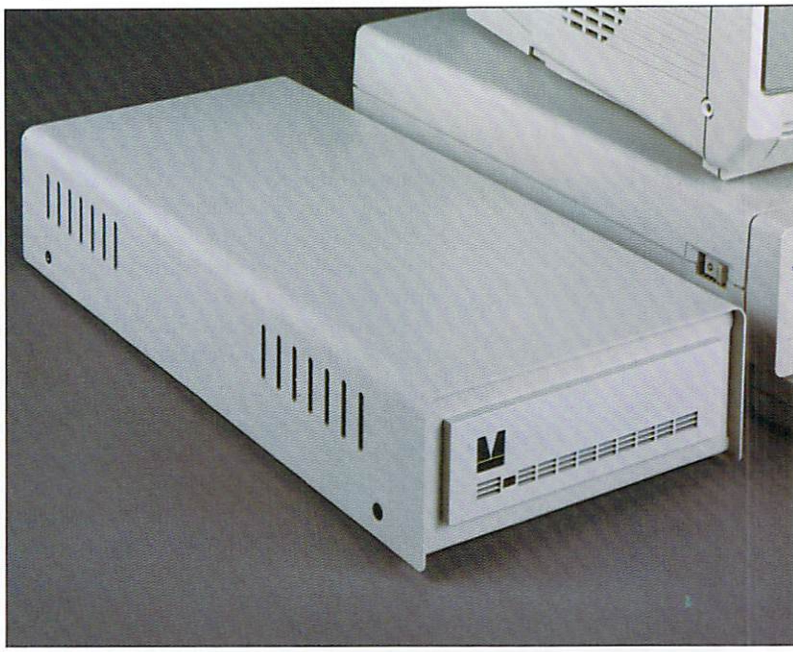
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MAS-Drive20 (complete): $1495.00. Note: *requires* final release version of AmigaDos 1.2 (or later) in order to operate. Average access time: 65 milliseconds; track-to-track: 20 milliseconds. Latency: 8.33 milliseconds, average. As many as *six* MAS-20's may be daisy-chained together on the SCSI bus provided by MAS-Drive.

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and includes a general introduction that was not in the originals.

AmigaDOS Reference Guide by Arlan R. Levitan and Sheldon Leemon (Compute! Books. $14.95) is a comprehensive DOS user's guide aimed at those who wish to learn more about the CLI and its operation. It covers all the DOS commands and has a complete explanation of the screen editor (ED) and the line editor (EDIT).

Mastering AmigaDOS by Jeffrey Stanton and Dan Pinal (Arrays Inc. $16.95) explains disk and directory structure, multitasking, the CLI and all DOS commands with example applications. It guides novices through field-tested sample sessions, and it introduces experienced users to the more advanced features of AmigaDOS.

Programming

Advanced Amiga Basic by Tom Halfhill and Charles Brannon (Compute! Books. $16.95) is a very comprehensive and serious book that offers much to the intermediate and advanced Basic programmer. It covers all aspects of Amiga Basic in detail, with many examples and useful programs. One of the best books available on programming in Amiga Basic.

Amiga Programmer's Handbook by Eugene P. Mortimore (Sybex Books. $24.95) is a detailed explanation and introduction to the Amiga ROM kernel libraries. It covers the Exec, Graphics, Animation, Text, Layers, Intuition and Workbench. It is an invaluable reference guide to the Amiga ROM kernel system, regardless of how many other books or references you might have on the subject. Each routine is discussed and its syntax and register usage is demonstrated. The glossary offers details on implementing many of the more advanced Amiga display modes.

Amiga Programming Guide by Tim Knight (Que Corporation. $18.95) is a general introduction on using and programming the Amiga. It covers Amiga Basic, LOGO, C and AmigaDOS, and includes a discussion of some of the early software that was available for the computer. It offers some good insight on a number of Amiga programming languages, as well as the CLI.

Amiga Programming Guide edited by Stephen Levy (Compute! Books. $16.95) is another book that covers a lot of territory in the area of programming on the Amiga. It covers Amiga Basic, C, 68000 Assembly and AmigaDOS, and contains some very specific chapters on graphics and sound. Each chapter is written by a different author; each offers their own particular insight to the Amiga. A good handbook for the programmer just learning the advanced aspects of the Amiga.

Inside Amiga Graphics by Sheldon Leemon (Compute! Books. $16.95) is a specific and advanced tutorial on programming Amiga graphics. Most of the discussion centers on C examples, but there are many Amiga Basic examples as well. Topics covered include screens, windows, drawing functions, text, sprites and BOBs, as well as advanced topics like super bitmaps and dual playfields.

Inside the Amiga by John T. Berry (SAMS. $22.95) is a comprehensive tutorial on programming the Amiga with the C language. It covers Intuition, Amiga data structures, lists and objects, interrupts, playfields and animation. It also offers a C-language refresher.

Music, Sound and Graphics on the Amiga by Mike Boom (Microsoft Press) is a detailed introduction to the Amiga's sound and graphics capabilities. It should be on dealer's bookshelves by the time you read this. Price was not available at press time.

From the Horse's Mouth

Amiga Technical Reference Set (Addison Wesley). This is the public version of the documentation that, originally, only a chosen few developers could obtain. There are four volumes in the set: the *Intuition Reference Manual* ($24.95) is a detailed description of the Amiga's Intuition user interface; the *Hardware Reference Manual* ($24.95) is a very detailed explanation of the Amiga's sound and graphics hardware, as well as its communication devices (mouse, printer, serial, disk, etc.); the *ROM Kernel Reference Manual: Exec* ($24.95) is a detailed discussion of the Exec, the Amiga's multitasking executive system; finally, the *ROM Kernel Reference Manual: Libraries and Devices* ($34.95) describes the graphics-support routines (including text and animation), Workbench, the system devices and the floating-point libraries. These four volumes are absolutely essential for the serious Amiga applications developer. They are somewhat better than the original developer's manuals in that they have had their examples corrected and now include an index.

IFF Technical Notes (Commodore Business Machines/Technical Support Group. $20) is a description of the various IFF formats for sound, graphics and text.■

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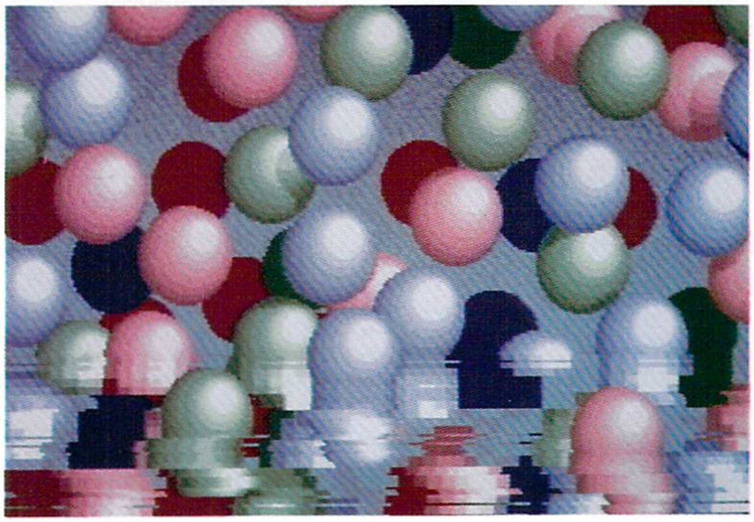
This month's exhibit features the work of James M. Shook. Jim teaches film animation at the School of the Museum of Fine Arts in Boston and does freelance work in computer animation.

Jim Shook has many years of experience in the area of graphics and animation. Although the courses that he teaches at the School of the Museum of Fine Arts do not involve computer animation, Jim says he uses the school's four Amigas on his own time.

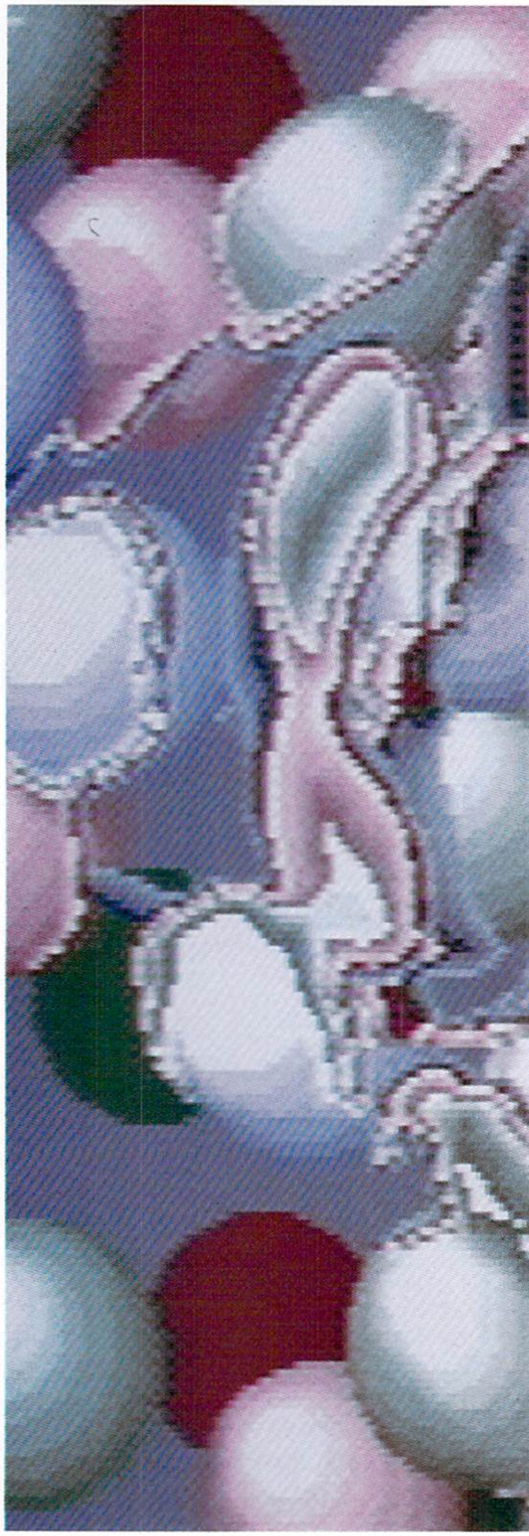
Computer-generated graphics are becoming more and more involved in video technology, he notes. "Video graphics and animation have taken over many of the functions that were done on film, such as movie credits and other things that are now being done by character generators."

Jim anticipates that computer animation will become a larger medium as computers become more powerful, mainly through the addition of increasingly inexpensive memory. "Animation that's now done on expensive equipment will be done on much smaller systems," he says.

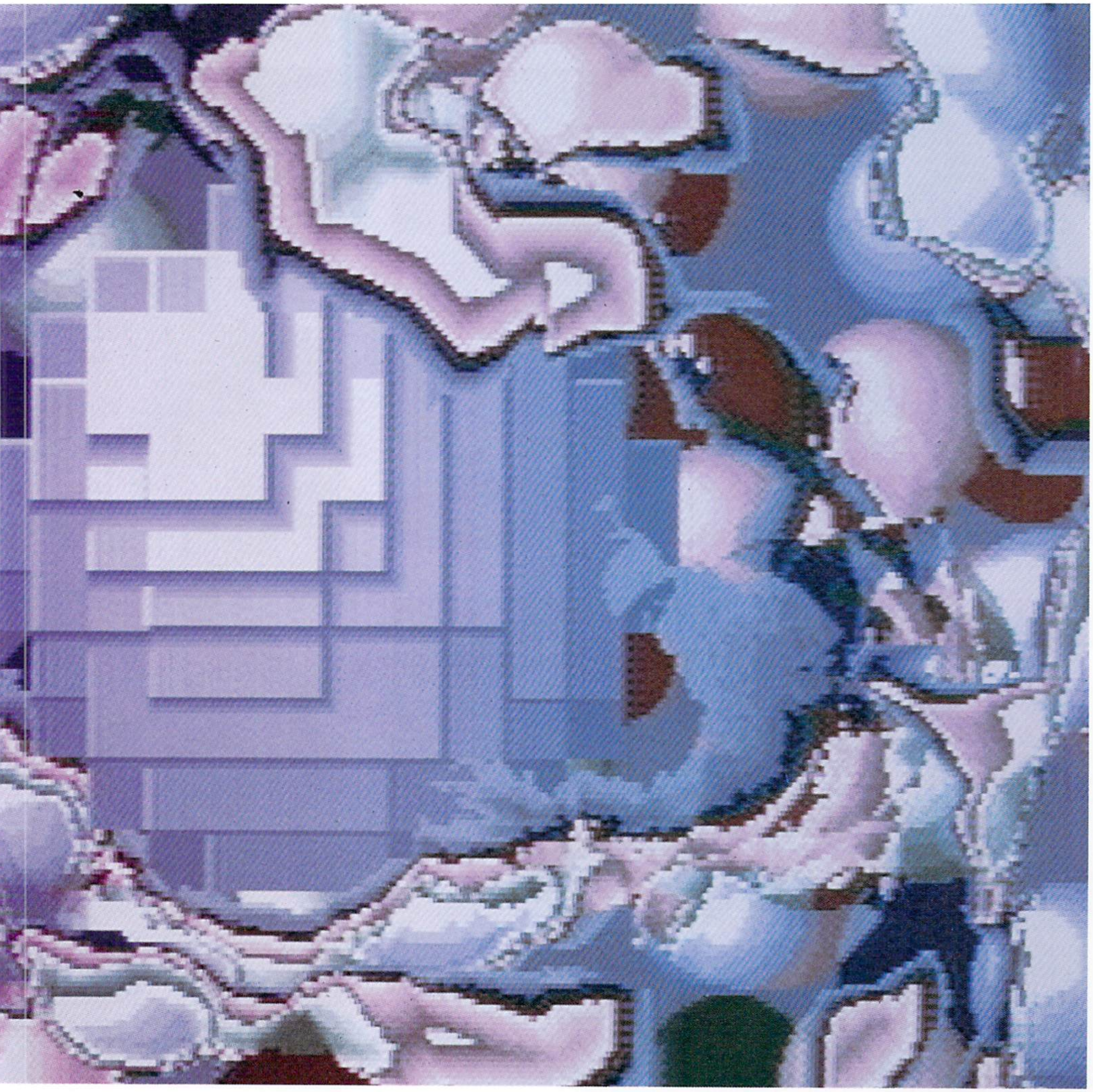
Jim has studied previously at Harvard's Department of Visual and Environmental Studies and has done freelance work on projects such as Suzan Pitt's animated film "Asparagus" and various *Nova* presentations for Boston's WGBH TV.■



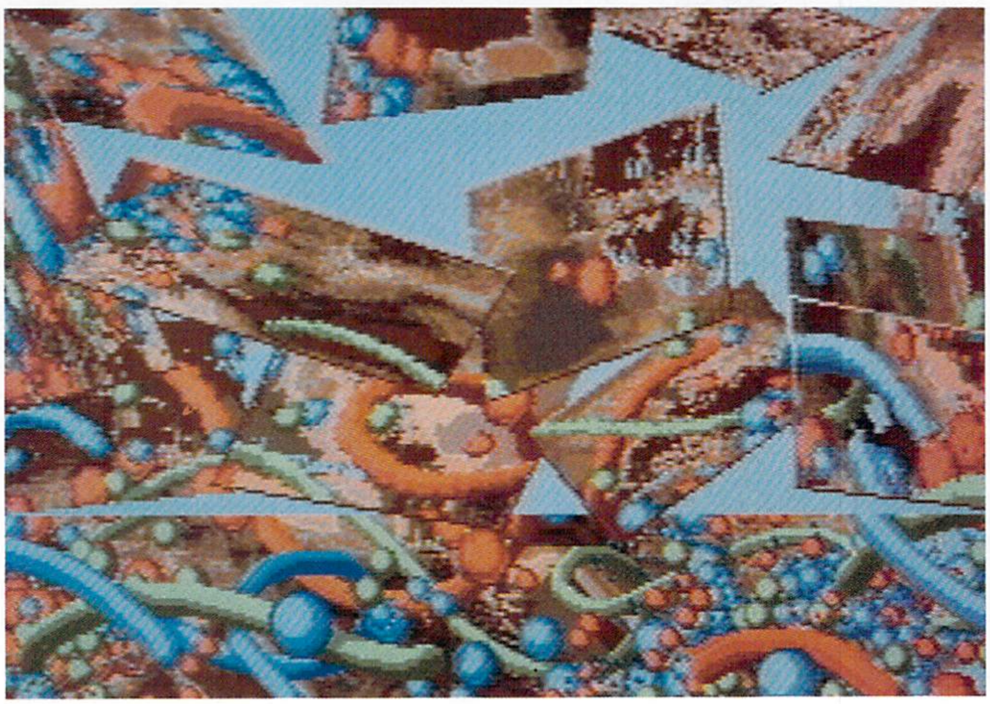
Reflecting Balls

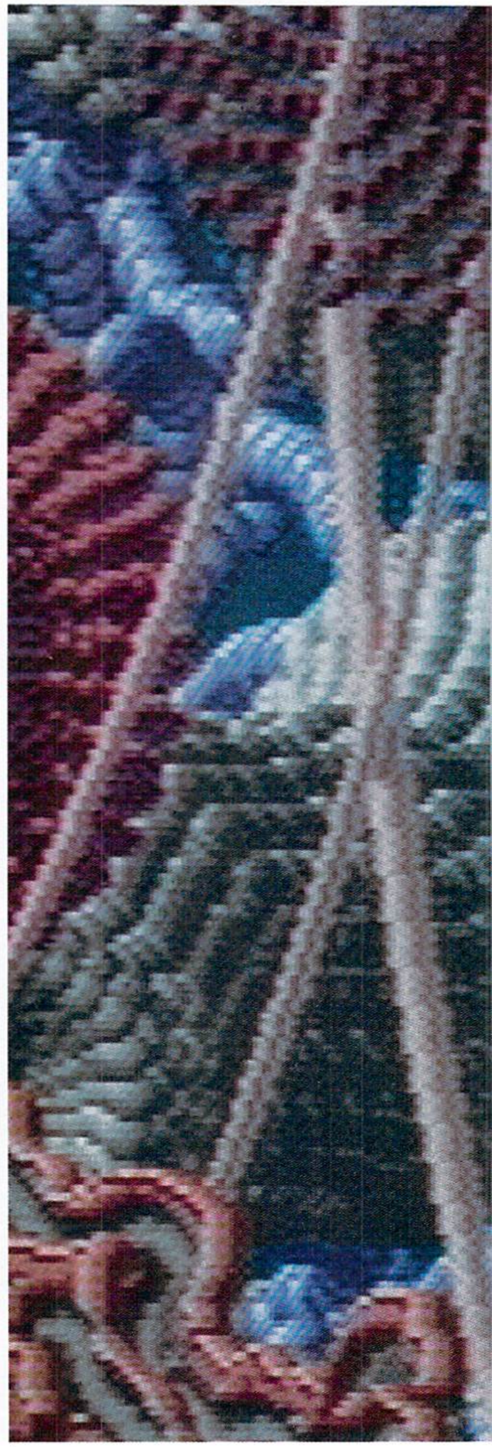


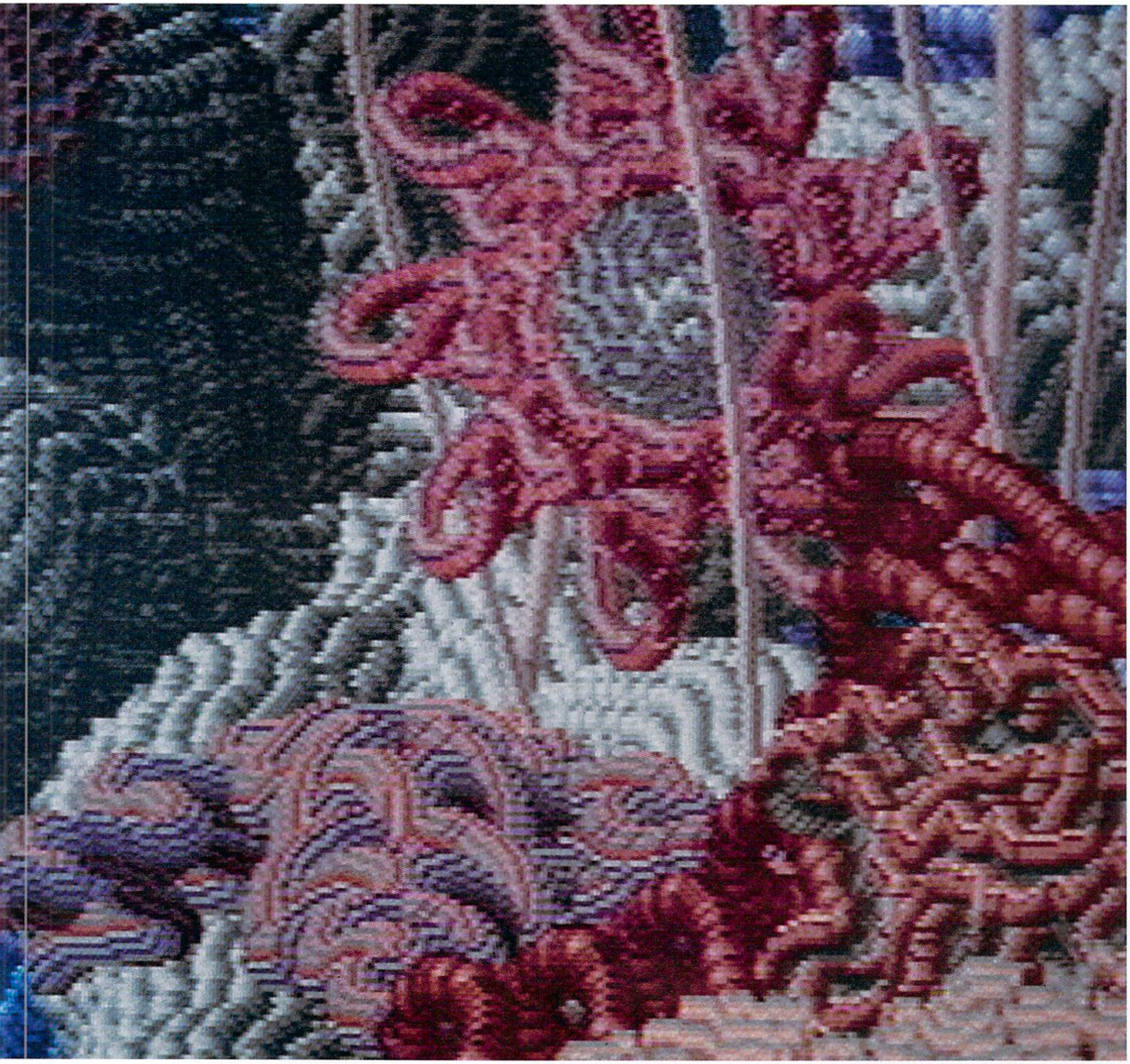
Breakthrough

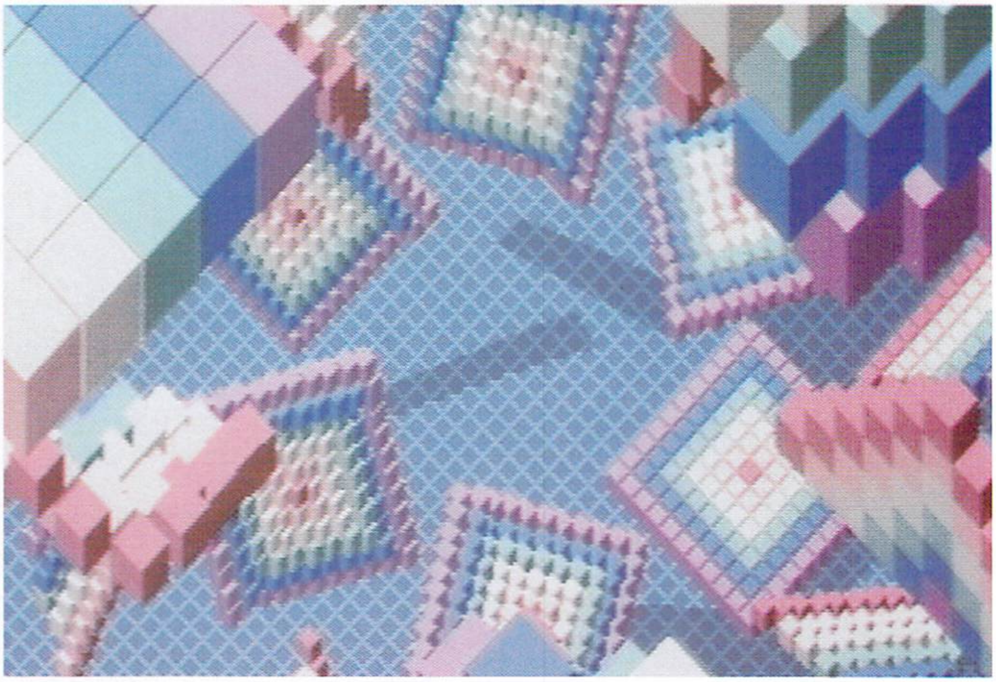



Landscape


Shatterscape


Anemone



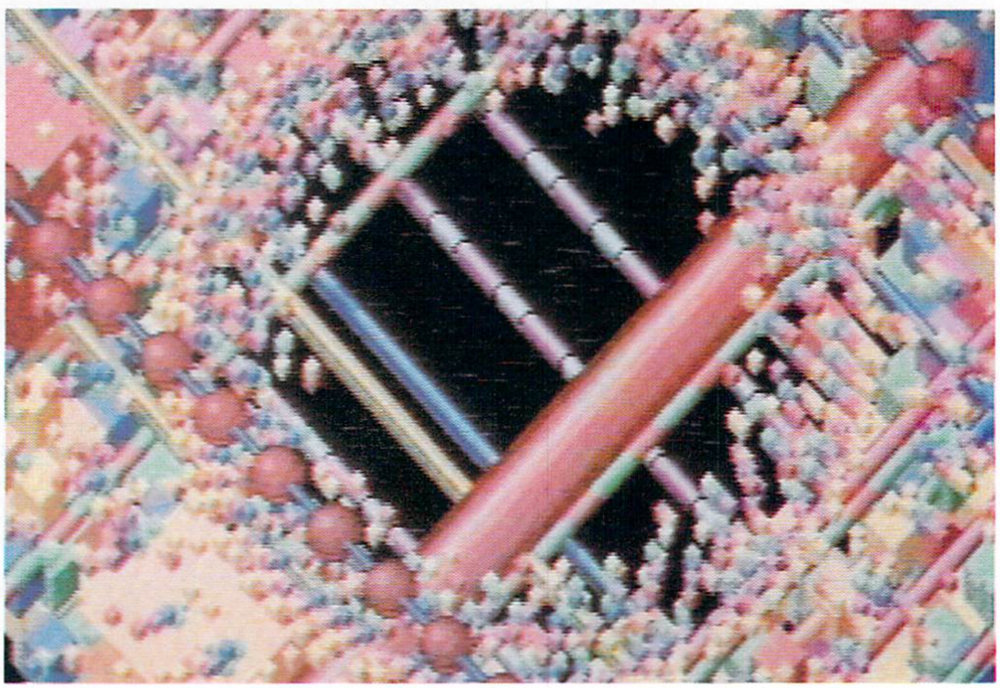


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Geoscape

Reviews

Digi-View

By Stan Kalisher

Seeing is believing with this video digitizer. Digitize pictures in low and high resolutions and save them as black and white, 32-color IFF, or 4,096-color hold and modify files.

Digi-View is the video digitizer from NewTek of Topeka, Kansas. The product consists of a small flat plastic box (a little bigger than a Zippo lighter) with a parallel port connector on one side and an RCA pin connector on the other side, the Digi-View software and a filter wheel and holder with Red, Green, Blue and Clear filters. The user must supply a video camera, which should be a monochrome RS-170 video camera with 2:1 interlace. A standard color video camera will work, but the quality of the digitized images will be diminished by at least 50 percent.

Easy as One, Two, Three

The system is extremely easy to use; I had no trouble at all producing great full-color pictures in less than ten minutes! Unlike Amiga Live! (The Frame Grabber), Digi-View does not digitize in real time or accept a color video signal (hence the monochrome camera). Digi-View uses the additive color method of producing full-color pictures. This technique is really quite old, but very reliable and was even used by NASA to send back some of the color Surveyor pictures from Mars. Three full exposures are made: one through a Red filter, one through a Green filter, and the final one through a Blue filter. Each exposure adds only the color that can pass through its filter, similar to adding it to a film emulsion. As each exposure takes about 8 seconds, the objects you digitize must be either flat art or still objects. (I have tried it with people, but I couldn't get anyone to sit still long enough for the 25 to 30 seconds needed for a full-color exposure.) There is a "Fast-Scan" mode, which cuts the time down to about 4–5 seconds per exposure, but it also loses about half the resolution of your picture.

Display Modes

Once the three exposures have been made, you can immediately display your picture in one of three modes: 4096 IFF, 4096+ IFF or 2–32 Color IFF. The 4096 IFF mode is commonly called HAM mode (for Hold and Modify), a graphics mode unique to the Amiga that allows the entire 4,096 color palette to be displayed on the screen at one time. The 4096+ IFF mode sharpens the image a lot and eliminates most of the annoying speckles that sometimes appeared with the first release of the software. Even though the HAM pictures are lo-res (320 x 200), the color saturation and resolution are so good, you'd swear that the picture is being broadcast. The 2–32 Color IFF mode transfers the image into a standard IFF picture file that can be read and modified by any of the various paint programs. A Palette option that allows the user to ad- ►



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just any or all of the colors in the palette used, or load in previously created palettes, is included also. You can even specify the number of colors used, from two to 32; this is particularly useful when reproducing line drawings because you can specify that only black and white be used. I enjoy creating 3-D pictures using four colors.

Tweeking

Once you have the digitized image on the screen, various menus allow you to adjust every facet of picture quality from brightness, contrast and sharpness to color saturation and hue. You can even adjust individual colors as they relate to each other. Once you have your image fine tuned, you can save your picture to disk in the HAM mode or the standard IFF mode, or as raw RGB data for later readjustment. You can also produce very high-quality lo-res black-and-white IFF pictures with 128 gray levels in only one pass (about 6–8 seconds). If that's not enough to get you interested, Digi-View has another nice surprise: It can also digitize in black and white using the Amiga's hi-res (640 × 400) mode, and without that annoying flicker common to the interlacing!

I found a few drawbacks to the Digi-View system. For acceptable quality, a monochrome camera with a 2:1 interlace is really essential (an RGB broadcast camera is the exception), and this type of video camera is generally hard to find, being used mostly for security systems. Fortunately, NewTek realized this and sells the cameras also. Because the HAM pictures aren't in a format that can be read and modified by programs like DeluxePaint or Images, they can't be altered with them. (However, at least two HAM paint programs will be on the market soon: one from NewTek and another from GeneSys Technologies. As I have only seen a very early pre-release from GeneSys, I'll reserve comment for now.) Perhaps my only real complaint is that Digi-View lacks a pass-thru on the parallel port. I'd like at least a switch box; having to unplug the Digi-View in order to use my printer is a pain.

NewTek also sells a motorized filter wheel ($49.95) that plugs into the joystick port and cycles the proper filter into place before the next exposure, and a few other accessories like copy stands and lenses.

Conclusion

Considering that the price of Digi-View is only $199, and black-and-white cameras are available for between $100 and $300, this product is a must for any serious "graphics mechanic." It's easy to use and the results are very impressive.

Digi-View
NewTek
701 Jackson, Suite 3B
Topeka, KS 66603
913/354-9332
$199.95
Requires RS-170 monochrome video camera with 2:1 interlace (or RGB broadcast camera). Copy stand recommended

Scribble!

This reviewer hopes that the last word hasn't been written on this word processor.

By Douglas Watt

Although the name suggests a light-weight word processor, Scribble! is a relatively powerful text editor and text formatter. Scribble! was developed by Micro-Systems Software and is marketed by Brown-Wagh Publishing. Pending the release of the other announced Amiga word processors (some well-known, others not), it is safe to assume that Scribble! is currently the best of the existing (and admittedly small) group of word processors written for the Amiga. However, the program has some minor problems and a few peculiarities that I hope will be corrected in future rewrites. Fortunately, Scribble! escapes much of the "icon-psychosis" associated with Textcraft. (Textcraft is so totally taken over by icons that one must assume that the program was written with the most computer-phobic of individuals in mind.) Scribble! avoids going to those extremes, while offering some icon support for various functions such as cutting, pasting and copying text.

Literary Criticism

Overall, I think that the program reflects a competent effort that certainly deserves further polishing. In terms of its most serious faults, the program has just too little control-key command structure support—it relies too heavily on a menu-oriented command structure. It also does not go far enough in establishing a page-oriented screen; it is not totally "page oriented." This means that the program forces the user to live with embedded commands to change margins or spacing in the middle of a document, instead of the more elegant approach seen in the best word processors, in which each line has a separate buffer in which formatting directives can be placed (seen for example in the better MS-DOS and Mac word processors, and, on CBM operating systems, in Paperback Writer). In other words, with Scribble! what you see is not necessarily what you get.

Mostly Mouse and Menus

Scribble! supports virtually all of the standard text-editing and text-manipulation operations that one has come to take for granted in even middle-of-the-road word processors, including icon-and-mouse oriented cutting and pasting operations. It is commendable that at least some of the menu-driven operations can be done just by using command keys (such as open Amiga-E for returning to the editing mode from one of the other modes), but I can only wonder why they didn't provide that type of dual command structure support for all of the various editing processes. It is a chore to have to use the menus all of the time when you want to access cutting. Only editing, pasting and copying can be accessed via keyboard commands (search and replace, along with any cutting of text, forces you to go the "mouse and menu" route). Given the ease with which text can be highlighted in a mouse-supported word processor, it is a shame that the program forces you to first access a menu to change from the "crayon" editing icon to the "cutting" scissors icon before you can do any highlighting—it takes away from the speed-of-operation benefits that are potentially conferred on the user by the mouse as a cursor control device.

Screen Formatting

Where the program also stumbles a bit is around the question of screen formatting and the fact that it doesn't provide a fully page-oriented screen. Text formatting is controlled either via line length commands that can be embedded in the text (printing formatting commands are preceded by a dot), or via the defaults that control spacing, line length, and other parameters such as justification, top and bottom margin and page offset. Cursor controls are fairly flexible, but there is no provision for moving the cursor a word at a time or a sentence at a time, and this makes cursor movement at times more cumbersome than it might otherwise be. It would also be preferable to be able to control the default characteristics, so that, for example, you wouldn't have to ►

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start out with justification if you didn't want to.

Help Screens

Help screens are available from two different function keys: F2 provides explanations of all of the dot commands that are used in printer and text formatting, and F1 lists all of the screen-control and screen-formatting functions that the word processor supports. Again, in this area of on-screen help the program leaves me with the feeling that the program's many nice touches are just not fully carried through and polished, and that the rough edges still need some attention. It would have been much better to have the help screens function as windows that could be shrunken and moved, instead of stuck on one spot on the screen. For example, it would be nice to have the dot command help screen on-screen as a movable window that could be consulted while constructing the default files that control formatting. Instead of these screens being "non-windows," it would make much more sense to use the much faster approach of having the help screen cleared via just hitting the return key instead of the much more cumbersome route taken in Scribble!, in which the mouse is necessary to move the cursor to the relatively small Resume box.

File Management

Regarding file management, there are also some things that need some rethinking. First and foremost is the fact that the software does not provide a means for linking long files together, despite providing multiple-text windows that can be opened at any given time. I don't think that windowing capability should be seen as an adequate replacement for either a virtual memory approach to long files or at least the ability to link files together. Since there is only 64K of text per window there are some serious limits on the length of documents that the writer can work on. Given that most users are likely to be working with a 512K Amiga, there is no reason that the software couldn't trade some support of extra windows with the capacity to hold more text. I consider this a real shortcoming, and one that must be addressed in the program's future updates.

Printer Support

There is also the problem of the lack of printer file support in the program itself; one must go back to Workbench to change printer files. Given that the current editions of Workbench support very few printers, this is potentially a very big liability for the program, despite the fact that Workbench 1.2 is supposed to support a number of additional printers. Although one can get around this by using the dot commands to send printer control codes, this is really a cumbersome and tiring solution. In fairness to the program, there may be a tendency to neglect this issue in view of the supposed operating system support for printer selection. However, I think that any program that is aiming to be a general-purpose word processor should address the real lack of printer support given by the current editions of the operating system.

Memory Limits

The only other major problem is that if the user starts opening multiple windows they start to exponentially increase the chances of a system crash. This is often a problem on the Amiga in multitasking; as you get closer to the RAM limits of the machine, you run the risk of getting one of those infernal *guru* messages, and losing whatever you've got in all of the windows if you haven't saved everything. This is not really a criticism of the word processor, and you can (from CLI) set the error tolerence of the operating system so that it doesn't do this so frequently, but frequent saving, if one is working within 60K of the RAM limits of the machine, is a caution to be religiously observed. It is also a real pain to have to reboot, even if you have been conscientiously saving as you go along and have not lost the whole works. Speaking of saving, the programmers should be commended for their one key-press saving (hitting F4 saves the current file back to disk under its original name and erases the old file). Given the speed of the DOS, this means that even fairly long files are saved and resaved in a few seconds. This feature is something that should be available on all text editors, and it encourages frequent saving, definitely a smart idea. Hopefully, future editions of the operating system will allow the Amiga to be more merciful when it gets close to its RAM limits, but in the meantime, the one-key press save is a saving grace.

Summary: Good to Better

Overall, I think that Scribble! is a competent piece of work, but I am looking forward to a future version, which, I hope, will have some of these problems ironed out. A more page-oriented screen, and the ability to chose whether one works from menus or from control-key sequences could make this good word processor a great one. At this writing, if you want the *absolutely best* text editing on the Amiga, you are still forced to run it as an MS-DOS machine and pick up something like WordPerfect, but the progress in this area of support for the machine is encouraging, and a sign that hardware this powerful will soon have the software to match.

[*Editor's note: Shortly before press time, we received Scribble! version 2.0 at the offices of* AmigaWorld. *It has built-in spell checking and mail merging features and, among other additions, expanded keyboard command control. We'll let Doug comment on the improvements soon.*]

Scribble!
Brown-Wagh Publishing
16795 Lark Ave. #210
Los Gatos, CA 95030
408/395-3838
$99.95
No special requirements

Instant Music

Two perspectives. The novice's view from air guitar trainee Bob Ryan; the musician's view from Peggy Herrington, who actually owns real instruments and can read music.

By Bob Ryan and Peggy Herrington

The Novice's View, or "I Ain't Afraid of No Notes"

I can't play a musical instrument and I doubt I ever will. Before I learn to read music, I plan to learn to read Gaelic; which means I'll probably never get around to reading music. In so many words, I'm an average American: I love music, but who has the time to learn all that stuff?

Computer music programs have always left me cold, mainly because they aren't written for me. They're written for musicians and composers and music students—people who already *know* music.

Instant Music is the first music program for musical illiterates. I love it. Using Instant Music, I can play an instrument; I can compose songs; I can create my own orchestrations and arrangements (even though I'm not sure exactly what those words mean). In other words, I can have fun. In fact, playing with Instant Music is the most fun I've ever had with a personal computer. ▶



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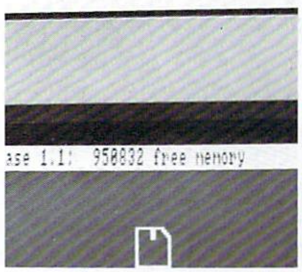
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Instant Music is easy to use. You load a song, choose one of the four instruments, and pick mouse-jam mode. As the other three instruments play their parts, you improvise yours with the mouse. Moving the mouse up plays a higher note; moving it down plays a lower note. You can specify single notes or chords. You control the volume and octave of each instrument, and the general tempo of the piece. You can change instruments at will. (I like to get four electric guitars playing a round such as Row, Row, Row the Boat). If you feel daring, you can even get the program to relax its grip, allowing you the freedom to mess up the tempo.



If you want, you can get the computer to play all four instruments. You can also alter the built-in songs to your heart's desire. I'm sure that any two-bit note editor is a better composition tool than Instant Music, but I don't care, I just want to play Baba O'Reilly. . . "Out here in the fields. . . ").

The Musician's View, or "While my Mouse Gently Squeaks"

Instant Music is a *lot* of fun and is just about as instantly musical as you can get, because there's so much music theory disguised by that flashy, color-coded display. Close scrutiny will help you spell chords and become familiar with progressions and harmonic relationships. And becoming a mouse virtuoso without relying on guides to stay within the rhythm and tonal center of the other voices will require some practice.

There's little doubt in my mind that Instant Music is intended for performance rather than composition. It's very flexible rhythmically, but I got frustrated transcribing sheet music into it, not because it doesn't use standard notation (which it doesn't), but because it won't sustain anything beyond one measure. Sustaining instruments are there —Strings, SynGuitar, DoVoice (oh! that DoVoice!) and PipeOrgan—but it restarts all attacks at the beginning of every measure. This lends a textural sameness to the music that effectively eliminates slower, legato pieces.

But don't underestimate it. With a range of 4-½ octaves (which, I suspect, accommodates 90% of all music ever written) and 43 song files plus 22 rock and jazz progressions that really are fun to play along with, how can you go wrong? Most anything can be altered during play and voices are digitized samples of real acoustic instruments. Twenty voices are provided and arrangements are made by any four sounding at once. They are instantly recognizable if you keep each in its proper register (don't play Sax too high or Piano too low) and put the sound through a home stereo system. Particularly good are percussive sounds (Vibes and Marimba) and the DrumKit which contains five drums implemented by octave number (from one to five): bass, tom, snare, high hat and woodblock. Only one drum can play at a time (unless you load the DrumKit into more than one channel) but you can switch between them at speeds your ears simply won't believe.

One feature builds two- or three-part chords down from the tonic in the first inversion, which seems clumsy to me. A couple of other nits I have to pick are that both sample and song IFF standards lack standardization, you must use RELABEL—not RENAME—to change the name on your backup disk; and *good luck* booting from a backup disk.

Instant Music is the first program I've seen for any computer that lets you make really good music with no training whatsoever. And believe me, if Bob Ryan can do it, you can, too!

Instant Music
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DeluxePrint

This reviewer isn't sure that DeluxePrint will make a very good impression.

By Abigail Reifsnyder

First impressions can be deceiving. That's why—no matter what I think of a program ▶

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during my first session with it and no matter how long that first session is—I always sit down with a program at least a second time. I gave DeluxePrint three shots. My first impression: DeluxePrint is limited and buggy (it kept crashing on me). My second impression: Same as the first (only at this point I was getting annoyed). Third and final impression: DeluxePrint is a deluxe pain in the neck.

Inking Up

But enough of impressions. Let's get to the facts. DeluxePrint requires 512K and Kickstart 1.1. It uses the "key" copy protection system, so you can make a working copy but must insert the original in the drive briefly to get started. (Before you open the program, you must set your printer options in Preferences.)

The initial screen gives you the format options: Sign, Label, Banner, Letterhead, Greeting Card, Calendar and Four-tile sign. When you choose one, you are shown the appropriate workslate and a new set of options. Before you do anything, you will want to set the "Paths," that is, where the program will look for and save information. The initial settings have the program looking only to the internal drive (DF0:), so if you want to save things to a data disk in an external drive, you will want to change some of the options to DF1:. DeluxePrint calls the four drive-dependent items "format" (signs, labels and so on), "groups" (the pictures you use to create signs, labels and so on), "import" (pictures you want to bring from another program) and "export" (pictures you want to send to another program). This is about the most important part of the program and the source of many of my problems with it. If you make a mistake by requesting something that isn't on the disk you specify here, more times than not, the program will simply hang in never-never land. But more on this later.

Artist's Proof

Once you choose a format, let's say Sign, you can very easily create your picture. There are three areas of a format: image, border and text. If you choose Image, you are shown the next menu of options. Before you can do anything else, you will have to select an image. A number of groups of images are included in the program as well as on the art disk that comes with the package. (If you want to look at the pictures on the art disk and that disk is in the external drive, you must be sure to set the "groups" path to DF1:.) When you select a group, a page of images is shown. If you select one, it is automatically placed on a clipboard and you are returned to the workslate. You can then place it anywhere on the workslate. If you are going to use more than one image, though, it's much more efficient to go right back to select and keep selecting images to your clipboard. That way you can avoid scrolling through all the groups while you're actually creating your sign (or whatever). All you have to do is choose Clipboard and select an image from there.

Once you have placed an image on the workslate, you can manipulate it in a number of different ways. You can move it, copy it, flip it (in four directions), remove it, change its size (double or half) and change its color (using the palette of 16 colors).



You can also edit the image by either adding or erasing lines (using the background color). You cannot make an image more than one color, however; if your ice cream cone is red, for instance, it's all red. If you want to make the ice cream a different color than the cone itself, you're out of luck. (At least within the program. You can, however, export the cone to a drawing program, make the changes you want, and then import it back into DeluxePrint.)

When you select Border, the next image you choose will be made into a border automatically, whether it was originally intended to be a border or not. Very simple.

Text offers more options. A one-line box at the bottom of the workslate appears into which you type whatever text you want. Several fonts are available and samples are displayed to the left of the selector box on that font. When you have placed the text, you can manipulate it in ways similar to an image.

Making An Impression

To print the sign, you simply select Print. You are then asked if you want to print "automatic," "semi-auto" or "custom." Automatic, obviously, prints according to a standard format. Semi-auto lets you change the dimensions proportionally. Custom lets you make the sign any size you want. You cannot stop printing once it has begun (with- ►

out rebooting the program, that is).

All of this sounds very straightforward, right? So what's my gripe? My first problem began with saving—though I didn't realize it at the time. I saved several things—a greeting card, a sign and a calendar—so I could print them all at the end. (The Okimate 20 I was using is painfully slow, so I wanted to be free to go off and do something else while my creations were printing.) Everything appeared to be going well when I saved them, but when I went back to load them, I was informed that my disk was unreadable. I was unable to trace the problem—since nowhere along the line was I given any hint of a problem. But so what, right?

The second time around, the program saved the workslate but not the images in the workslate. The third time, I finally had success. I'm not going to pretend I know what the problem was, because I don't. (For what it's worth, I had someone looking over my shoulder and he couldn't figure it out either.)

Out of Register

The strength of a printing program such as this should lie in its ability to import images you create in a sophisticated graphics program. In fact, that is one of the selling points of DeluxePrint—its compatibility with DeluxePaint. So I pulled out my disk with pictures I'd drawn with DeluxePaint. Every time I tried to pull in a picture, the program crashed. This was for a very simple reason: All my pictures were in low resolution and DeluxePrint was looking for medium-resolution pictures. In other words, I had to create new pictures. Undaunted, I rebooted the system with DeluxePaint in the internal drive and made my medium-res picture. In order to import it to DeluxePrint, though, I had to save the picture as a brush—and not just any brush, a particular size brush (either 88 × 52 pixels or 264 × 156 pixels). Then, once the image has been successfully imported to the program, it cannot be manipulated. You can move it on the workslate, but you can't change its size or color. And you can't edit it. Let's just say I've used more flexible programs in my life.

This led me to wonder about Electronic Arts' claim that DeluxePrint is IFF compatible, so I pulled out my Aegis Images disk. In order to import a picture from this program, I had to leave the drawer name blank (under Import in the path menu). And sure enough, it imported the picture I requested. Of course, in order to import it, it cut out half the colors (to use only the first 16 of the palette) and squished it to fit in the workslate. As it turned out, I could import any picture from DeluxePaint as well—if I didn't mind half the colors disappearing and the picture being distorted. Call me picky, but for $99 and claimed IFF compatibility, I want a little more flexibility. I also don't want to have to spend half my time guessing what *drawer* name will be acceptable.

The Cleanup

I understand that printing programs are very popular—Broderbund's Print Shop proves it. But the whole time I was using DeluxePrint, I kept wondering what it was offering me that I couldn't do more easily and with more flexibility with DeluxePaint or Aegis Images (the two paint programs I have). The answer is brief: DeluxePrint puts the four panels of a greeting card in the right places so that when you fold the paper, it all comes out right. That's the advantage. Beyond that, I'm still wondering.

DeluxePrint
Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
415/571-7171
$99.95
Requires 512K, printer

►



Enhanced for Amiga – Better Graphics, Sound, Play Action!

Captain's Log . . . War Date 10.01.44



"Captain's Log, October 1, 1944. 0250 Hours. Fleet submarine USS Hammerhead proceeding Southwest at cruising speed. Our mission: intercept enemy convoy off the coast of Borneo. Disperse and destroy."

Atari 520ST screens shown



"0300 Hours. Two hours until dawn. Radar picks up convoy, escorted by two destroyers. We believe that one of the enemy's valuable oil tankers is part of convoy formation."



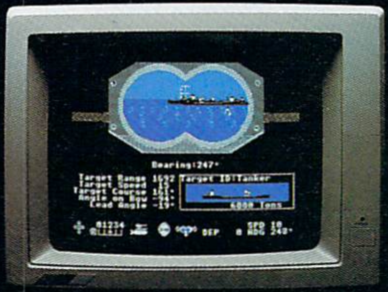
"0400 Hours. Lookouts on the bridge. Target identification party reports one tanker, 6,000 tons, troopship of 10,250 tons, with two *Kaibokan*-type escorts. Moving into attack position."



"0500 Hours. Sound General Quarters! Battle stations manned. Preparing for torpedo run. Gauge Panel OK. Periscope OK. Charts and Attack Plot Board OK. All mechanical systems OK."



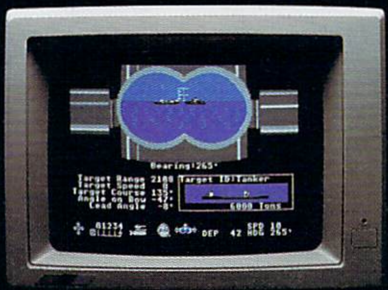
"0525 Hours. Torpedo rooms report full tubes forward and aft. Battery at full charge for silent running. We hope water temperature will provide thermal barrier to confuse enemy sonar."



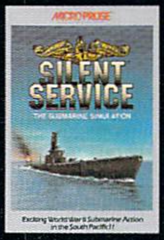
"0600 Hours. We are at final attack position. Convoy moving at 10 knots. Target distance decreasing rapidly . . . Crash Dive! Escorts have spotted us and are turning to attack! Rig to run silent."



"0700 Hours. Depth charged for one hour. Some minor damage, but repair parties at work. Destroyer propeller noises receding. We'll come to periscope depth for our return punch."



"0715 Hours. Torpedo tubes 1, 2, 3 fired. Two destroyers hit and sinking. One of the enemy's last tankers coming into 'scope view — an ideal target position. On my mark . . . Fire Tube 4! Fire 5!"



"Superb" raves Scott May in *On Line*, "strategic intensity and heart-pounding action have rarely been merged this successfully." *Analog* calls it flatly "the best submarine simulation so far." *Compute* comments "Silent Service's detail is astonishing." Join the more than 150,000 computer skippers who have volunteered for **Silent Service**, the naval action/tactics simulation — from MicroProse.

Silent Service is available for Commodore 64™/128™, Amiga™, Apple II family, Atari XL/XE, Atari ST, IBM PC/PC Jr, and Tandy 1000, at a suggested retail price of $34.95 (Atari ST and Amiga, $39.95).

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Available from your local retailer. If out-of-stock, contact MicroProse directly for further information on our full range of simulation software, and to place Mastercard/Visa orders.

MICROPROSE
SIMULATION • SOFTWARE
120 Lakefront Drive • Hunt Valley, MD 21030 • (301) 667-1151

Circle 198 on Reader Service card.

Mean 18 and Leader Board

From bogeys to birdies: A comparative review of two golf simulations.

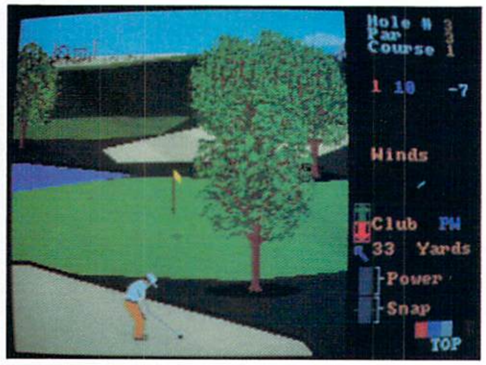
If you are a golf buff or just like to play a good computer game every now and then, you should seriously consider purchasing either Mean 18 from Accolade Software or Leader Board from Access Software. Both games are basically the same. They are golfing simulations where you control the players as they work through the various hazards, greens, putts, roughs, satisfactions and frustrations of a real game of golf.

The two games vary only slightly and each has its good points and bad. Both games allow up to four players at a time (the only way to play against the computer is to play against par). You use the mouse to control everything from club selection to aiming your swing (each game uses a slightly different system for controlling the club swing, but both systems are easy to learn, difficult to master). Both versions have the usual hazards and features you would expect to find on a real golf course, such as sand traps, water hazards, trees, roughs, fairways, greens, etc. They each feature realistic perspective graphics and four different courses.

Leader Board

Leader Board has better, more realistic graphics. The screen layout is much cleaner. It is also quicker to learn and easier to master. There are three levels of difficulty: Novice (ball is not affected by wind and will not hook or slice), Amateur (ball is not affected by wind but player must control hook and slice), and Professional (where player must adjust for wind, hook and slice). On all levels the player must decide which club to use. Each player can play at a different difficulty level for handicapping purposes. Playing with more than one person is a lot of fun, but you should pay attention to who is up because it is easy to play someone elses turn. Stroke power, hook and slice are determined by a small gauge (about 2 inches high on an Amiga monitor) which may be too small for fine adjustments of strokes. You aim your shots by dragging a cross above the player, so the view doesn't change, just the aim.

Once on the green the steepness of slope is displayed rather crudely and while the perspective (as if you were standing right



Leader Board from Access

behind the player) is nice, it is hard to get a "feel" for the green. The greens on all the holes seem identical and it is simply a matter of getting to know how much power for the distance and how much aim for the slope. If you master those two things putting is no longer a challenge on any green. Two other points: The Leader Board disk is not copy protected but you must have the hardware *key* that comes with the game plugged into the rear mouse port (Mean 18 uses standard copy protection). This protection scheme has it's pluses and minuses. You can make lots of copies of the program for backup purposes, but it is also easy to misplace the key.

Mean 18

Mean 18 has elements that make it a better game, though the graphics are not as nice. It has no adjustment for wind, and the sound sometimes is more distracting than enhancing (crowd cheers sound more like airforce jets taking off and the ball makes a dull thud when it bounces). It has three different forms of scoring (stroke, match and best ball), two difficulty levels (beginner, where the best club is suggested and you always have perfect aim, and experienced, where everything is up to you), a practice tee, green and hole (where Leader Board only lets you practice tee shots). The four courses, rather than generic as in Leader Board, are St. Andrews, Augusta, Pebble Beach and Bush Hill. You can create your own courses or modify the four with a program called Course Architect, ensuring that Mean 18 will never be mastered.

With the architect, you can modify everything down to the trees and skyline as well as the fairways, greens, hazards, etc. Creating new courses is very easy and can be a challenge, or it can be a lot of fun (by redesigning the trees and skyline I played on one of the first other-worldly courses).

Other features also make Mean 18 a bet-



Mean 18 from Accolade

ter game. When the ball hits the ground it takes a slightly random bounce. This ensures that you will never be able to play the same hole exactly the same way twice (with Leader Board it is possible to memorize holes, aim, and power settings to play a hole almost exactly the same way each time. Wind direction and strength are the only altering factors.) Mean 18 features an overhead view of the putting green that includes graphic representations (direction arrows) of multi-level slopes and pitches making each green unique, and much harder to master. The aiming system varies from Leader Board significantly. On the green in Mean 18, your aim is controlled by moving a line that extends from the head of the putter out. (This could have been much nicer if you could drag the line itself rather than adjust it's direction by multiple clicks on "up and down" arrows.) Off the green, you can scroll the view in front of the player 180 degrees. Mean 18's overhead view adds the feature of showing where your first shot went, then the second shot, etc. Finally, Mean 18 is closer to reality in it's scoring. (Put the ball in the water and you can choose to reshoot with penalty strokes added or pick a "line of sight" drop. With Leader Board you just lose the stroke and must shoot again.)

The Nineteenth Hole

Conclusions? Leader Board has better graphics and sound. It is a "cleaner" game. It is challenging and entertaining while being easy to learn. This would be a good choice for parties and kids. It is definitely one of the better games available for the Amiga and will provide a lot of fun for a wide range of people. It could have a bit more variety and complexity, could save top scores (Mean 18 saves top scores on disk), could provide a little more differentiation when playing with more than one person, and the power gauge could be bigger.

Mean 18, while not as graphically sophisticated, is harder to master, has infinite variety by letting you design your own courses, has more elements of chance mixed with skill, and is more true-to-life in play, scoring and variation on the greens. It does have faults: the sounds are poor and it would be nice to be able to drag the direction bar directly (during putts) rather than clicking on arrows at the bottom of the screen. The power gauge is big enough but inaccurate when putting, and because of the power, hook and slice system used by the program, it is almost impossible to click the mouse buttons fast enough to avoid slicing the ball during a short chip shot onto the green. (Chip shots should get easier the shorter the distance, not harder).

I suggest Mean 18 if you are serious about your golf or computer gaming, and Leader Board if you prefer nicer graphics and all around family entertainment.

—Amiga World

Mean 18
Accolade
20833 Stevens Creek Blvd.
Cupertino, CA 95014
408/446-5757
$44.95
Requires 512K

►

Hors d'oeuvres

Unique applications, tips and stuff

You may be using your Amiga at work, at home, or in the back seat of your car, but somehow you'll be using it in a unique way. You will discover things that will let you do something faster, easier or more elegantly.

AmigaWorld would like to share those shortcuts, ideas, things to avoid, things to try, etc., with everyone, and we'll reward you with a colorful, appetizing, official *AmigaWorld* T-shirt. (Just remember to tell us your size.)

Send it in, no matter how outrageous, clever, humorous or bizarre. We will read anything, but we won't return it, so keep a copy for yourself. In cases of duplication, T-shirts are awarded on a first come, first serve basis.

So, put on your thinking berets and rush those suggestions to:

Hors d'oeuvres
***AmigaWorld* editorial**
80 Elm Street
Peterborough, NH 03458

Leader Board
Access Software Inc.
#A 2561 South 1560 West
Woods Cross, UT 84087
801/298-9077
$39.95
Requires 512K

InfoMinder

InfoMinder is an information management system, and a conceptually important Amiga software package.

By Louis R. Wallace

InfoMinder, from Byte by Byte, allows you to create organized unions of text and graphics that can be efficiently retrieved and displayed. These text files can be created by you, or you can use and modify existing text documentation files as long as they are in an ASCII format. InfoMinder documents can also contain IFF graphics in the form of DeluxePaint brushes or Images windows. These IFF brushes can be inserted into the body of the text as illustrations. This is a feature many of us have wished for in a text editor, so finding it in an information processor is a pleasant surprise. The InfoMinder package also offers the programmer the ability to use its file system within programs as on-line documentation. (In this case, InfoMinder will have to be present as a background task, however).

Information Control

You control InfoMinder by using the mouse to interact with the InfoMinder menu interface. This interface is similar to the standard Intuition user interface found on many Amiga programs, but here the menu bar headings contain titles of the various topics InfoMinder finds on the current disk. Using the mouse, you can select a subject of interest, causing an index to be quickly loaded into memory. The index contains the names of the major sections found in the chosen topic. These section headings can also have indexes of subheadings, and those sub-subheadings, and so on. Once you have selected the area of the document you want, you can begin browsing through the text. At any time you can jump forward or backwards a page, or perhaps go on to a separate section (or a different document). And at any time you can place a "bookmark" to hold your place till the next time you get a chance to return to your reading. You can even have the Amiga read to you if you wish!

While InfoMinder can be used with any ASCII text file, it is most useful with text files that have been created using IMaker, the text compiler. This program can be used to generate a document that uses the InfoMinder format, and allows you to manipulate the text color, font, size, position, spacing and a variety of other characteristics. You do this by embedding special commands into the document, which can take some time depending on the size of the document and the complexity of the display you are creating. It is here that the organization of your document is decided. IMaker has no idea of how the document should be arranged, so it is up to you to decide what and where the section headings will be in your file. You will need to have a firm idea of how the file should be organized in order to get a useful InfoMinder document.

By using IMaker you can make InfoMinder-style documents out of existing text files. For example, a friend made an InfoMinder version of the MicroEmacs (a text editor) documentation file. He gave me a copy, so I can now enjoy the fruits of his labor. And in fact, Byte by Byte expects a large number of InfoMinder files to be available in the public domain. Currently I have several others, including a restaurant guide for San Francisco, Amiga ROM kernel C include files, some IFF pictures and of course the InfoMinder documention. As time goes on there will be many useful datafiles for InfoMinder users.

The main idea behind InfoMinder is to allow the Amiga user to organize his or her data into a usable and logical format. Since the Amiga has well-defined standard data types (IFF), InfoMinder was written to take advantage of these data standards. Future revisions of the program are already being planned, and they will allow the inclusion of full screen IFF graphics (not merely brushes), IFF sound files, and even CD-ROM interfaces.

All in all, I like InfoMinder. It is a relatively fresh idea, is well thought out, and has the potential to add greatly to the Amiga user's capability.

InfoMinder
Byte by Byte
3736 Bee Cave Road, Suite 3
Austin, TX 78746
415/964-1860
$89.95
No special requirements

Little Computer People Discovery Kit

"Yes, Timmy, the truth is there really are little guys who live inside computers."

By Bill Jacob

Long have I pondered the cause of all my computer-related misfortunes. Like when I couldn't save a long Basic program that I just typed in, merely because I loaded an itsy-bitsy machine language routine over a portion of the disk operating system. And like the time when my keyboard produced regular characters when I held down the control key and control characters when I didn't. I have suspected that something not exactly straight-forward has been going on in there.

"So Who Invited You?"

When I found out that Little Computer People (LCPs for short) live inside computers and have been the cause of all my misfortunes, I became malicious. After discovering that Activision had designed a home for them in my monitor (sort of an electronic dollhouse) and even invented some commands so that I could communicate with them, I quickly tried pressing CTRL-R in hopes of placing the little guy on a rack in his basement. Instead, a record was delivered to his front door and he picked it up, waddled up the stairs, popped it on the stereo and smiled in appreciation. Still determined, I tried CTRL-C, hoping that I could maybe confine the stubby fellow in a cage somewhere. But instead, his phone rang and he answered it and started talking to me in Chipmunkese. Finally, undaunted in my vengeance, I challenged him to a game of War. But, as my pile of cards slowly grew smaller, I had to swallow my pride and reach for his life-support system—the Amiga power switch. But there he was, smiling, trying to be a friend. Somehow I knew I was doomed. And I know he's still in there.

A Humble Abode

When the "house-on-a-disk" is first loaded, an LCP will enter the house and look around to see if he wants to stay. After careful inspection, he will leave and then return with his suitcase and pet dog. Although there are different LCPs, you can't tell which LPC will move into your house and there is only one LCP per disk.

This program is cute. From the neat little house that is displayed on the screen to the way the LCP walks up the stairs, everything reflects cuteness. Even my LCP's name is cute—Myron. Myron can type a letter to me and picks up the phone when I call. He gets things that I leave for him at the front door and keeps himself amused by playing the organ, watching television, exercising, starting fires in the fireplace, computing, or reading *AmigaWorld* from his Archie Bunker-type chair (well, it *might* be *AmigaWorld*). And when he seems to run out of things to do, he knocks on the screen and asks me to play a game with him. He can play anagrams (word jumbles), Card War, 5-Card Draw Poker (who said this was just for kids), Blackjack and Word Puzzles (guess a group of words that are represented by their initials in a phrase). About the only thing an LCP doesn't do is work.

This program only has a few minor problems. First the tangibles: Perhaps the most annoying aspect of the program is the interface through which you communicate with your LCP. Typing any letter on the keyboard creates a two-line text box at the top of the screen, but as you continue to s-l-o-w-l-y type, you'll soon find that letters tend to get lost somewhere. (Could Myron have a mischievous wife hiding in there?) Also, ►

LCPs don't drop what they're doing when you ask them to do something else. And since they have minds of their own, they do other things in between and appear to ignore you at times. I occasionally become frustrated with Myron, and can easily envision a five-year-old tossing a Mr. Potato Head at the monitor. The program also takes a long time to load; Myron must shower and clean up the house before he lets me in.

And now the intangibles: Why aren't there any female LCPs? Could it be that Activision would have to take down Myron's bathing suit calendar in the den? And why doesn't my LCP shut the TV off when he leaves the room? *I* always had to shut our TV off if nobody was going to watch it!

Before deciding to adopt an LCP, you must realize that they could provide a youngster (and quite possibly yourself) with many hours of entertainment and greatly increase the demand for your Amiga at home, so watch out. But don't worry about having to pay a higher electric bill; simply send the bill to your Little Computer Person (I tried *ASSIGN electric.bill LCP* from the CLI). And if for some reason he doesn't pay his rent and utilities (mine hasn't), you could forward the bill to his natural parents at the address given below.

Little Computer People Discovery Kit
Activision Inc.
2350 Bayshore Frontage Road
Mountain View, CA 94043
415/960-0410
$49.95
No special requirements

Grabbit

A screen print and save utility that comes with a special bonus.

A lot of software for the Amiga is capable of producing colorful and interesting screen displays. Most programs, however, do not give you a means to print or save such screens. Grabbit is a utility program from Discovery Software that resides in memory with your application and lets you save screens to disk or print out a hard copy. Although it doesn't work with all programs, Grabbit is a very good utility that doesn't interfere with the operation of other programs on your system.

Grabbit comes on a Workbench disk inside an eighteen-page manual. The manual clearly states how to install and run Grabbit. You can install Grabbit from Workbench or the CLI. During installation, the program checks on the availability of the printer device you specified in Preferences and makes sure that you have enough room for Grabbit. If everything is OK, Grabbit tells you that it has successfully loaded.

Once installed, you access Grabbit through HotKeys; you press three keys simultaneously to call a particular Grabbit function. Grabbit has five HotKey commands: Print, Save, Next, Cancel and Quit. You access the commands by pressing CTRL + ALT + the first letter of the command. Thus, to print a screen, you hold the CTRL + ALT + P keys simultaneously. Grabbit is called from the nether reaches of your computers memory and activates its printer function. You don't have to leave your application to access Grabbit; it's always there.

Functions

When called, the print function first makes a copy of the current screen. It then becomes a low-priority background task that doesn't tie up system resources while it prints the screen. You can continue to work on an application—or even start up a new

one—while Grabbit plugs away printing your screen. If there is a memory crunch and Grabbit doesn't have room to make a copy of the current screen, you get a warning that Grabbit is going to have to lock the screen in order to print it. In this case, you can't continue to work while Grabbit prints. You can elect to cancel printing with the CTRL + ALT + C HotKey.

The Save function saves the current screen in IFF format. It works with all screen resolutions, even Hold-and-Modify screens. It assigns a unique filename to each picture based upon the resolution and number of bit-planes used in the screen. It saves screens to the directory you designate with the GrabAssign utility.

The Save function saves the topmost screen. If you want to save a different screen, you must first use the Next function. This brings the next underlying screen to the front and sends the current screen to the back. You use this function to change screens for printing or saving. The final Grabbit function, Quit, removes Grabbit from memory by freeing-up the memory assigned to it.

Restrictions

Grabbit cannot capture BOBs or sprites. These objects are stored apart from the bit-planes that define the Amiga's screens. I discovered this when I saved a screen from Mind Walker. When I loaded the screen into DeluxePaint, it didn't have any of the characters. I got around this by drawing the characters by hand with DeluxePaint. In addition, Grabbit can only print or save one playfield from a two-playfield display.

The biggest problem I had with Grabbit was with misbehaving software. A lot of software, especially games, insists upon taking over all the resources of the Amiga. Many, in fact, are self-booting programs that only load with a warm boot. With such software, you can't load any other program, Grabbit included, into memory first. I also had problems with software that would open the printer device as soon as the software loaded, and not just when the software accessed the device.

These problems are not problems with Grabbit; they just showed up when I tried to use Grabbit. I wish that software developers would remember that the Amiga is a multitasking machine and that they should design their software to run in a multitasking environment.

Anytime

As a bonus in the Grabbit package, you get another memory-resident program called Anytime. Once you've loaded Anytime, you call it with a CTRL + ALT + A HotKey sequence. Anytime pops up and lets you modify the palette of the current screen. It has red, green, and blue sliders and lets you adjust any or all of the values of the current palette. Anytime is a neat little program and a nice adjunct to Grabbit. It has the same problems that Grabbit has with misbehaving software.

Conclusion

Grabbit is an excellent way to print and save Amiga graphics images. It has limitations, especially regarding BOBs and sprites, but it does its job well. As developers become used to the Amiga environment and produce better behaving software, you'll be able to use Grabbit with more and more software.

—B. Ryan, AmigaWorld

Grabbit
Discovery Software International
262 S. 15th St., Suite 400
Philadelphia, PA 19102
215/546-1533
$29.95
No special requirements ■

What's New?

New Amiga products we think you should know about.

Compiled by Bob Ryan

Push-Button Telecommunications

MacroModem is the first in the MacroWare line of software products from Kent Engineering & Design. MacroModem is a telecommunications package that gives you access to 36 macro strings at any one time, and it lets you switch to a new set of 36 macros at any time. Each macro in MacroModem can be up to 35 characters in length. These characters can be text, control characters, function keys, or other macros. MacroModem lets you automate your on-line sessions.

MacroModem supports Xmodem (checksum or CRC) and text transfers. It includes a File Filter that chops Amiga binary files automatically. It also translates between Amiga, Macintosh, and MS-DOS text files. The program supports baud rates from 110 to 262,000. It can emulate TTY or ANSI-standard terminals.

MacroModem supports auto-dial, and keeps a phone directory on disk. The program retails for $69.95. For more information, contact Kent Engineering & Design, 4215 Jordan Road, PO Box 178, Mottville, NY 13119. 315/685-8237.

Wordy Programs

Gold Disk Inc. has two new programs for the Amiga. **PageSetter** is a personal publishing program for the Amiga. It lets you mix text and graphics on the same page and print them with any Preferences-supported printer. PageSetter supports multiple fonts and type styles, multiple columns, proportional spacing and text justification. You can import text from a word processor, and the size of your PageSetter document is dependent solely upon the amount of memory you have in your system.

Gold Spell is a spelling checker for the Amiga. It includes a 90,000-word dictionary that you can expand. Compatible with most Amiga word processors, Gold Spell scans your word-processing documents and lets you change the spelling of words that are not in its dictionary. It even suggests correct spellings.

PageSetter lists for $100; Gold Spell for $49.95. For more information, contact Gold Disk Inc., 2179 Dunwin Drive #6, Mississauga, Ontario, Canada L5L 1X3. 416/828-0913.

More Hardware

C Ltd. has announced three new hardware add-ons for the Amiga. **aMEGA Box** is a 6-slot, 100-pin, auto-config expansion chassis that retails for $599. aMEGA Box is about four inches high and sits under your Amiga monitor. It includes a pass through for further expansion and comes with a 150-watt power supply.

aMEGA 2 is a memory-expansion board that contains two megabytes of fast RAM for the Amiga. The board is 100-pin and auto-config, so it will work in any expansion chassis that meets Commodore-Amiga's specifications. A board with two megabytes retails for $449. You can also buy the board without any memory chips.

Finally, C Ltd. has announced

the **aMEGA 20**, a 20-megabyte SCSI drive and controller for your Amiga. The aMEGA 20 is a stand-alone box that attaches via the Amiga expansion bus. It is auto-config and contains a pass through. It lists for $995. For more information, contact C Ltd., 723 East Skinner, Wichita, KS 67211. 316/267-6525.

Big Daddy Database

Superbase is a new database management program for the Amiga that can handle a lot of data. It supports databases with an unlimited number of files; any or all of which can be open at any time. You can have 16 million records per file with an unlimited number of fields per record. Text fields are limited to 255 characters, and no file can be larger than 17 gigabytes (17 billion bytes).

Superbase lets you nest an unlimited number of sort keys and provides powerful searching tools. Superbase is menu driven, so you don't have to know how to program to use it. If you prefer the power of a command programming language, however, Superbase includes the dataBASIC language, a powerful Basic interpreter that includes database maintenance and query commands.

Superbase retails for $149.95. For more information, contact Progressive Peripherals & Software, 464 Kalamath Street, Denver, CO 80204. 303/825-4144.

Expanding AmigaDOS

The Metacomco Shell is an improved CLI that simulates many features of a UNIX shell on the Amiga. The Metacomco Shell remembers command lines you enter for later editing and execution. It allows for easy creation of resident commands and aliases—shorthand versions of AmigaDOS commands. The shell also lets you use variables in place of long sequences of text, to push and pop directories, and to search multiple paths.

The Metacomco Shell is a product of Metacomco, the company that wrote AmigaDOS. It retails for $79.95. Contact Metacomco at 5353 #E Scotts Valley Drive, Scotts Valley, CA 95066. 408/438-7201.

Polaroid Palette Plus

Imprint, from Liquid Light, combines the *Polaroid Palette* system with Amiga-specific adapters, cables and software to create a system that lets you make a Polaroid print, 35mm instant transparency, or standard 35mm prints and slides of any Amiga screen. The Polaroid Palette is a recording system that, up to now, has worked only with IBM PC and Apple II computers.

Imprint is an expensive system—it retails for $2,495—and it is directed towards businesses. The software allows you to reproduce any IFF picture or brush file in any resolution—including hold-and-modify. The color editor lets you customize the color palette of any image before you capture the image on film. In addition to reproducing the screen, the Imprint software can also perform cyan-yellow-magenta separations.

Included with Imprint is ►

Snapshot, a RAM-resident utility. With Snapshot installed, you can make a Palette image of any Amiga screen at any time simply by pressing the F10 key.

Imprint includes the Imprint and Snapshot software, the Polaroid Palette Image Recorder, a Polaroid camera back, a Minolta 35mm camera back, a 35mm instant slide processing and mounting kit, and Amiga-specific cables and adapters. An upgrade kit for people who already own a Polaroid Palette is available. For more information, contact Liquid Light, 2301 West 205th Street, Suite 106, Torrance, CA 90501. 213/618-0274.

$3.00 Test Drive

Shanghai, a computer version of the Chinese strategy game Mah Jongg, is a new release from Activision. Shanghai is a challenging puzzle game that you win by removing 144 colored tiles from a five-level, dragon-shaped pyramid. Shanghai offers an enormous number of starting configurations so the game is different each time you play.

Activision is offering a Shanghai trial disk to anyone who wants to see what the game is like before buying. The disk contains one Shanghai pyramid that you can try to solve. Unlike the retail version, the pyramid on the trial disk never changes. You can obtain your trial disk by writing to Activision—Shanghai Demo Disk Offer, PO Box 7286, Mountain View, CA 94039. Enclose $3 for shipping and handling. Shanghai retails for $44.95.

Amiga No Trump

Artworx has released **Bridge 4.0** for the Amiga. This program lets you play bridge both with and against the computer. The program is mouse-driven and uses the Amiga's colorful graphics. It also uses the Amiga's speech synthesis. Bridge 4.0 retails for $29.95.

Also from Artworx comes **Hole In One Golf.** This game lets you control club selection, strength, hook and slice, and spin. You can use the supplied course or edit it to suit your fancy. Hole In One Golf lists for $29.95. Artworx also sells **Strip Poker** for the Amiga for $39.95. Contact Artworx Software Company Inc., 150 North Main Street, Fairport, NY 14450. 716/425-2833.

VAX Connection

MiddleMan lets your Amiga emulate a DEC VT-100 terminal. It turns your Amiga keyboard into that of a VT-100 and your monitor into a VT-100 display. MiddleMan supports baud rates up to 19.2K. If your work requires that you communicate with a VAX or with any computer that supports the VT-100 standard, look into MiddleMan. Middleman is $59.95. For more information, contact Benaiah Computer Products Inc., PO Box 11165, Huntsville, AL 35814. 205/859-9487.

But Can It Understand Alexander Haig?

The Pawn is a new illustrated adventure game that claims to have the finest parser of any microcomputer adventure game. The basic object of Pawn is to explore the world of Kerovnia; other objectives will become apparent as you play the game. In addition to its parser, The Pawn features full-color pictures that bring the land of Kerovnia to life.

The Pawn sells for $44.95. For more information, contact Firebird Licensees Inc., 74 North Central Avenue, Ramsey, NJ 07446.

Product Updates

In last issue's What's New?, I reported that Byte by Byte was producing a **multifunction**

board for the Amiga. I blew it: The multifunction board I described is a product of **ASDG Inc.** For more information, contact ASDG Inc., 280 River Road, Suite 54A, Piscataway, NJ 08854. 201/540-9670.

Deluxe Paint 2 from Electronic Arts is nearing release. In additon to upgrading the program to work with expanded-memory configurations, Dan Silva has added some new features such as perspective. For more information, contact Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. 415/571-7171.

Gimpel Software has released version 2.00 of Amiga-Lint, the C language diagnostic utility. **Amiga-Lint 2.00** includes support for ANSI C language extensions. Contact Gimpel Software, 3207 Hogarth Lane, Collegeville, PA 19426. 215/584-4261.

Multi-Forth 1.1 has been released by Creative Solutions Inc. It includes bug fixes, documentation corrections, a new floating-point package, and new sprite demos. Contact Creative Solutions, 4701 Randolph Road, Suite 12, Rockville, MD 20852. 301/984-0262.

Newsbriefs

At COMDEX/Atlanta last spring, Commodore was showing three prototypes of a new Amiga to selected dealers and third-party developers. From some developer friends, I learned that the machine had internal slots, an internal hard disk and a megabyte of memory. Although it used the same custom chips as the Amiga 1000, at least one of the prototypes used a 68010 instead of a 68000 CPU.

I didn't report on the new machine—then tentatively called the Amiga 2000—in my COMDEX report because I heard subsequently that the project had been scrapped. Well, it now appears that reports of the 2000's death have been greatly exaggerated and that it, or some other new Amiga, will soon see the light of day. Although I don't think the next Amiga will be the fabled 68020-based Ranger, any new Amiga will reinforce the notion that this machine is here to stay. We hope to give you details soon.

Strategic Simulations has released **Computer Baseball** for the Amiga. Computer Baseball lets you manage current major league players and teams. It is the first of many conversions of popular SSI games to the Amiga. Contact Strategic Simulations Inc., 1046 Rengstorff Ave., Mountain View, CA 94043. 415/964-1353.

World Games from Epyx takes up where Summer Games (I and II) and Winter Games left off. Events include Acapulco cliff diving, barrel jumping, sumo wrestling and log rolling. Contact Epyx Inc., 1043 Kiel Court, Sunnyvale, CA 94089. 408/745-0700.

Cardinal Software, 14840 Build America Drive, Woodbridge, VA 22191, produces schematic drawings of the Amiga. A set of four costs $24.95. To order, call 800/762-5645.

Print'n Wear are specially treated sheets of printer paper that convert regular printouts into iron-on transfers for T-shirts. A Print'n Wear 4 pack costs $8.95; a 10 pack lists for $19.95. Contact Foto-Wear! Inc., 62 Herbert Drive, East Brunswick, NJ 08816. 201/257-6549.

MathTalk and **First Shapes** are two more "talking" educational programs from First Byte, 2845 Temple Ave., Long Beach, CA 90806, 213/595-7006. MathTalk teaches basic arithmetic skills, while First Shapes introduces youngsters to different geometric shapes. MathTalk retails for $59.95 and First Shapes for $49.95.

Head 'em up, roll 'em out—**Mouse-Hide**! Lasso a *real* leather mouse pad for your Amiga, folks, just $15 from Pilot Enterprises, 5699 Kanan Road, Agoura Hills, CA 91301, 818/706-1818. Rollin', Rollin', Rollin', keep them mousies rollin'. . . . ■

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Help Key

By Bob Ryan

Basic Printing Revisited

Q: In your September/October '86 column, you dealt with the problem I'd been having in getting my Epson FX-85 to print in different styles from Amiga Basic. Your explanation worked fine for me except for those escape sequences for double strike and near-letter quality that include a double quote ("). For example, I've tried the following Basic statements to initialize near-letter quality printing. None have worked.

```
PRINT #1, CHR$(27) "[" "2"
  """" "z"
PRINT #1, CHR$(27) "[" "2" "
  "z"
PRINT #1, CHR$(27) "[" "2"
  z"
PRINT #1, CHR$(27) "[" "2"
  "z"
PRINT #1, CHR$(27) "[" "2"
  "’" "z"
```

Can you tell me how I can send a double-quote character as part of an escape sequence?

Richard Booth
Joplin, MO

A: Amiga Basic regards double quotes as delimiters in PRINT statements; it doesn't regard them as data to be sent to the screen or printer. To get around the problem, use the ASCII code for the double-quote character instead of the character itself. (You'll find a list of ASCII codes in Appendix A of the Amiga Basic manual.) Your print statement should look like this:

```
PRINT #1, CHR$(27) "["
  "2" CHR$(34) "z"
```

While I'm on the subject, last issue I ran an elaboration of how to use printer escape codes from Amiga Basic (Basic Printing Revisited, Help Key, November/December '86, page 126). Unfortunately, my elaboration was messed up because part of the escape sequence I used didn't make it into the magazine. Anyway, the line that reads "Thus, ESC m from the table becomes CHR$(27) " " "1" "m" in your Amiga Basic print statement" *should read* "Thus ESC[1m from the table becomes CHR$(27) "[" "1" "m" in your Amiga Basic print statement."

I hope that clears up any confusion you might have with printing from Amiga Basic. If I wind up having to write an explanation of this clarification of my elaboration of using escape sequences to control printers from Amiga Basic (whew!), I'm going to pack it in and head to the Galapagos, where (I'm told) there be nary a computer.

Icons Away

Q: I recently discovered that, while directories created under Workbench have visual icons, those created under the CLI do not. Is this correct? Also, when working under the CLI, how can you tell if a given directory is on your disk? How can you review your entire directory structure for a given disk? Can you get a printout of the directory structure of a disk?

Computer Duffer
Portland, OR

A: You're correct: Directories created under the CLI do not have icons. This is a great handicap if you like to move between the Workbench environment and the CLI. To get a listing of all the files and directories on a disk, you use the command DIR OPT A. This command lists your current directory and all files and directories below the current directory. To get a printout of your directory, you simply redirect the output of the DIR command. For instance, DIR>PRT: OPT A will list all the files at or below the current directory to your printer. If you're in the root directory, this command will list all files and directories on the disk.

Transparent Problem

Q: How can I transfer Amiga graphics to slides for presentations? Can I buy a high-resolution film recorder or a special CRT hood for taking screen shots. Do you know how much these items cost?

C. Wayne Caswell
Gainesville, FL

A: A California company named Liquid Light is producing a system called *Imprint* that combines the *Polaroid Palette* with the Amiga. Imprint includes the Palette, software, cables and connectors. It will sell for $2,495.

The Polaroid Palette is an expensive system ($1,500 alone, last time I checked) that makes Polaroid prints, instant 35mm slides and normal 35mm slides and prints from the graphics in your computer's memory. Currently, the Palette can be used with Apple II and IBM PC computers. See our What's New? section for a closer look at the Imprint System.

You can always take your own screen shots. These never look as good as slides created with the Palette, but you can get acceptable quality slides. Just set your camera on a tripod in front of the Amiga, darken the room, and take long-exposure (greater than one-thirtieth of a second) shots of your monitor screen. Experiment with various shutter speeds and f-stops to see what settings give you the best results, and use those settings as the basis of future shots.

Auto-Confusion

Q: I intend to add one megabyte of memory to my 512K Amiga. I would like to buy the memory and simply plug it into the side of my Amiga—the same way I plugged my 256K memory upgrade into the front. I want the memory to be instantly available to my system. My problem is that all the ads I see for memory expansion products scare me: What is all this talk about expansion chassis, card inserts, pass-through, autoconfig, addmem, relocating memory? Sounds too complicated for a novice to warrant spending close to a thousand dollars. Perhaps this deserves a feature article?

E. Morris
Sparta, NJ

A: Damn right it deserves a feature article, and as soon as Mark Van Name and Bill Catchings finish their report on the new 1.2 Kickstart and Workbench for the next issue, they're going to examine every memory expansion box and board I can round up for them. You'll see their report in the May/June issue of *AmigaWorld*.

In the meantime, let me try to clarify things. The most popular way to expand your Amiga is by using the expansion bus that comes out of the right side (as you face your Amiga) of the Amiga system box. An **expansion chassis** (also called a card cage) is a box that attaches to the expansion bus and contains a number of empty slots. You can put expansion boards (also known as cards) into these slots to give your Amiga more memory, a hard disk, or some other device or capability that you want. The primary job of an expansion chassis is to provide a place to put expansion boards.

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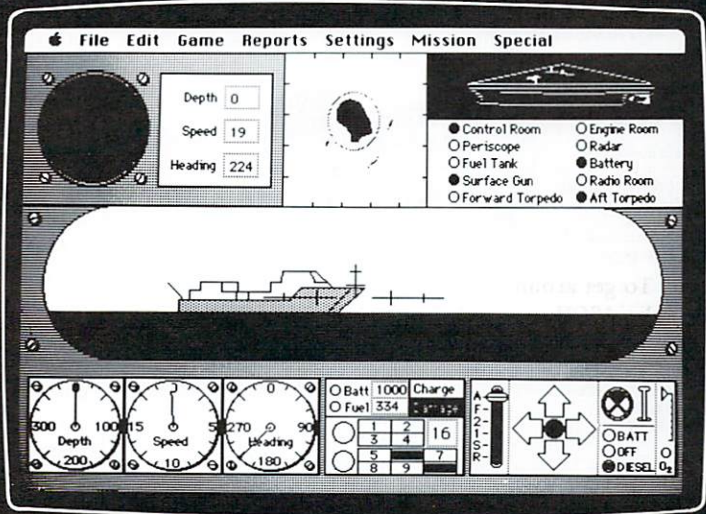
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Circle 63 on Reader Service card.

Hors d'oeuvres

Unique applications, tips and stuff

You may be using your Amiga at work, you may be using it at home, or you may be using it in the back seat of your car, but in some way or other, you are going to be using your Amiga in a slightly different way than anyone else. You are going to be running across little things that will help you to do something faster or easier or more elegantly.

AmigaWorld would like to share those shortcuts, ideas, unique applications, programming tips, things to avoid, things to try, etc., with everyone, and we'll reward you for your efforts with a colorful, appetizing, official *AmigaWorld* T-shirt. (Just remember to tell us your size.)

Send it in, no matter how outrageous, clever, obvious, humorous, subtle, stupid, awesome or bizarre. We will read anything, but we won't return it, so keep a copy for yourself. In cases of duplication, T-shirts are awarded on a first come, first serve basis.

So, put on your thinking berets and rush those suggestions to:

Hors d'oeuvres
***AmigaWorld* editorial**
80 Elm Street
Peterborough, NH 03458

[redacted]

"Self, why should I pay for five (or however many) expansion slots when I only plan to add 1 megabyte of memory (or one hard disk, or whatever) to my system? Aren't I paying for a lot of slots that I never intend to fill?" If you have a smart self, he/she will respond "You don't have to buy an expansion chassis and a memory board if you only intend to add one expansion device to your system; you can get by with adding a stand-alone memory box."

Stand-alone expansion devices (also known as side-mount devices) attach to the Amiga expansion bus just as an expansion chassis does. The difference is that these devices don't provide slots that you can fill with whatever boards you desire. Stand-alone boxes are complete self-contained expansion devices. Buy a memory box and you get ready-to-use memory for your Amiga; buy a hard-disk box and you get a ready-to-roll hard disk. You don't have to buy an expansion chassis and then add a memory board or a hard-disk controller.

What are the advantages of stand-alone devices? Normally, it's cheaper to buy a stand-alone device rather than an expansion chassis and a single expansion board. On the other hand, if you want to add more than one or two devices to your Amiga, or if you want to keep your future options open, consider getting an expansion chassis.

Once you've hung a chassis or a stand-alone box onto the expansion bus, you can't attach any other boxes to the bus unless the first one contains a **pass-through**. A pass-through simply passes the expansion bus through the device, providing other boxes with the same edge connector that the Amiga supplies. In a perfect world, if every box had a pass-through and its own power supply, you could daisy-chain an infinite number of expansion boxes together and expand your Amiga infinitely. Due to timing problems, RF interference, and the limited speed of electrons, however, you'll probably have problems if you try to attach more than two expansion devices to your expansion bus. Since one or both of these devices can be an expansion chassis, your expansion options aren't limited, although they're not infinite.

Autoconfig and **Addmem** are two methods to get your Amiga to recognize the existence of devices that you have attached to the expansion bus. Autoconfig is built into version 1.2 of the Amiga operating system. At startup, the autoconfig routines tell your system what devices are on the bus. These routines also allocate memory space to the devices on the bus, thus incorporating the devices into your Amiga system. Autoconfig is the preferred method for getting your system to recognize the existence of expansion devices.

Addmem is a program that also allocates system memory to devices on the expansion bus. Addmem, however, is not automatic. Addmem requires you to designate what devices get allocated what memory in the system. Autoconfig automatically keeps different devices from using the same memory space; Addmem doesn't. If you don't plan to add more than one device to your system, then Addmem is adequate. If you want to avoid memory conflicts, stick with autoconfig devices.

In your case, if all you want to do is add 1 megabyte of memory to your system, turn to the Hardware Guide in this issue, go to the Hard Disk and Stand-Alone Memory Boxes section, and check off all the 1 megabyte, autoconfig devices. You should buy one of these products. Which one? I don't know, I haven't used most of them. Until Mark and Bill complete their report, you'll have to rely upon word of mouth (which usually isn't that far off). Good Luck.■

In last issue's Help Key, page 127, column one, line four, ESC m should have been ESC[lm

Listing continued from page 54

```
*****************************************************/

extern struct Menu *MyMenu;

/*****************************************************
*
* This is the structure that must be submitted to
* the OS to open a screen.  These are the defaults.
*
*****************************************************/

struct NewScreen NewScreen =
{
    0, 0, 640, 200, /* LeftEdge, TopEdge, Width, Height */
    2,              /* Depth                             */
    0, 1,           /* DetailPen, BlockPen              */
/*
    Change the "HIRES" line to "HIRES | INTERLACE," to set
    interlaced display.  Be sure to change the Height field
    above to 400, or not enough screen ram will be initialized.
*/
    HIRES,
/*    HIRES | INTERLACE, */
    CUSTOMSCREEN,        /* Type                            */
    NULL,                /* Font - use default font.   */
    "Menu Test Screen" /* DefaultTitle for titlebar. */
};

/*****************************************************
*
* This is the default structure to open a window in
* the Intuition system.
*
*****************************************************/

struct NewWindow NewWindow =
{
    20, 20, 300, 100, /* LeftEdge, TopEdge, Width, Height */
    0, 1,             /* Width, Height                      */
/*
    These are the Intuition Direct Communication Port Flags.
    See the Intuition Reference Manual p.167 for description.
    In short, these flags indicate to Intuition the type of
    IDCMP messages this program wishes to use.
*/
    CLOSEWINDOW | MENUPICK,
/*
    These are the window parameter flags. See the Intuition
    Reference Manual p.66 for description.
*/
    WINDOWCLOSE | SMART_REFRESH | ACTIVATE |
        WINDOWSIZING | WINDOWDRAG | WINDOWDEPTH |
        NOCAREREFRESH,
    NULL,                /* FirstGadget                 */
    NULL,                /* default CheckMark           */
    "Menu Test Window ", /* Title                        */
    NULL,                /* Screen - standard screen */
    NULL,                /* BitMap                         */
    100, 25,             /* MinWidth, MinHeight        */
    640, 200,            /* MaxWidth, MaxHeight        */
    CUSTOMSCREEN         /* Screen Type                  */
};

/*****************************************************
*
*   This is the main entry point of this test driver.
*   All structure initialization has been done.
*
*****************************************************/

main()
{
    unsigned char   str[30]; /* struct to store window messages */
```

```
   unsigned int     i;        /* general purpose loop counter     */
   struct Screen *Screen; /* pointer for OpenScreen ret value*/
   struct Window *Window; /* pointer for OpenWindow ret value*/
   struct IntuiMessage *message; /* expected message pointer   */

/*
   Open each of the libraries and check for a NULL return. NULL
   indicates that the library is unavailable, and this program
   exits.
*/

    IntuitionBase = (struct IntuitionBase *)
                     OpenLibrary("intuition.library", 0);

    if (IntuitionBase == NULL)
        exit (FALSE);

    GfxBase = (struct GfxBase *)
               OpenLibrary("graphics.library", 0);

    if (GfxBase == NULL)
        exit (FALSE);
/*
    Open the screen with previously initialized default values.
    NULL indicates error of some sort, and an exit is taken.
*/

    if ((Screen = (struct Screen *)OpenScreen(&NewScreen))
       == NULL) exit(FALSE);

/*
   This initializes the only value in the window structure that we
   did not know at program initialization time. Place the returned
   pointer into the structure, and open a window.
*/

    NewWindow.Screen = Screen;

    if ((Window = (struct Window *) OpenWindow(&NewWindow))
       == NULL) exit(FALSE);

/*
    This line submits your menustrip declaration to Intuition.
*/

   SetMenuStrip(Window, MyMenu);

   Move(Window->RPort, 20, 20); /* Move text pointer in window */
   Text(Window->RPort, "Hello", 5); /* Set Hello in the window */

   for (;;) /* loop here until a CloseGadget message is received */
   {
/*
   This part of the program will wait for the message port to
   become not empty, and extract the message.
*/

       WaitPort(Window->UserPort);
       message = (struct IntuiMessage *)GetMsg(Window->UserPort);

       if ((message->Class) == MENUPICK) /* is the msg a menu
         msg? */
        {
/*
   The message received was for a menu selection. Clear the
   string to be sent to the window, and check for valid pick,
   or just a non-selection.
*/
           for (i = 0; i < 30; str[i++] = ' ');
           if ((message->Code) != MENUNULL)
               sprintf(str, "Menu %x Item %x Sitem %x     ",
                             MENUNUM(message->Code),
                             ITEMNUM(message->Code),
                             SUBNUM(message->Code));
           else
```

Listing continued on page 104

```
            sprintf(str, "No Item Selected.            ");
/*
   Move to the point at which this string is to be placed.
   Place the string there, and reply to the message.
*/

            Move(Window->RPort, 5, 20);
            Text(Window->RPort, str, 24);
            ReplyMsg(message);

        } /* End If-then clause */

        else
            break; /* Not Menu selection, must be closegadget. */

    } /* End For(;;) */

    ReplyMsg(message); /* Reply to messsage received. */

    ClearMenuStrip(Window); /* Remove menustrip previously
      declared. */

    CloseWindow(Window);
    CloseScreen(Screen);

    exit(TRUE); /* Indicate good exit. */

} /* End Main() */
```

Listing 2.

```
/*****************************************************************
*
*           MenuStrip Structure Initialization
*
*****************************************************************/

#include "exec/types.h"
#include "intuition/intuition.h"

/*
   Intuitext Initializations. See text for reason for
   organization of this file.
*/

struct IntuiText IText[] =
{
        { 0, 1, JAM1, CHECKWIDTH, 0, NULL, "Morning Star " },
        { 0, 1, JAM1, CHECKWIDTH, 0, NULL, "Long Sword " },
        { 0, 1, JAM1, CHECKWIDTH, 0, NULL, "Dagger " },
        { 0, 1, JAM1, CHECKWIDTH, 0, NULL, "None " },
        { 0, 1, JAM1, 0, 0, NULL, "Possessions " },
        { 0, 1, JAM1, 0, 0, NULL, "Pockets " },
        { 0, 1, JAM1, 0, 0, NULL, "Backpack " },
        { 0, 1, JAM1, 0, 0, NULL, "Personal " },
        { 0, 1, JAM1, 0, 0, NULL, "Health " },
        { 0, 1, JAM1, 0, 0, NULL, "Hits " },
        { 0, 1, JAM1, 0, 0, NULL, "Heal " },
        { 0, 1, JAM1, 0, 0, NULL, "Light " }
};

/*
    Here are the MenuItem initializations.
*/

struct MenuItem MenuItem[] =
{
    { /* MenuItem[0] : Morning Star */
        &MenuItem[1],
        0, 0, (120 + CHECKWIDTH + COMMWIDTH), 9,
        (CHECKIT | CHECKED | ITEMTEXT | COMMSEQ |
         ITEMENABLED | HIGHCOMP),
```

```
    0x0A,
    (APTR) &IText[0],
    NULL,
    'S'
},

{ /* MenuItem[1] : Long Sword */
    &MenuItem[2],
    0, 9, (120 + CHECKWIDTH + COMMWIDTH), 9,
    (CHECKIT | ITEMTEXT | COMMSEQ |
     ITEMENABLED | HIGHCOMP),
    0x09,
    (APTR) &IText[1],
    NULL,
    'L'
},

{ /* MenuItem[2] : Dagger */
    &MenuItem[3],
    0, 18, (120 + CHECKWIDTH + COMMWIDTH), 9,
    (CHECKIT | ITEMTEXT | COMMSEQ |
     ITEMENABLED | HIGHCOMP),
    0x08,
    (APTR) &IText[2],
    NULL,
    'D'
},

{ /* MenuItem[3] : None */
    NULL,
    0, 27, (120 + CHECKWIDTH + COMMWIDTH), 9,
    (CHECKIT | ITEMTEXT | COMMSEQ |
     ITEMENABLED | HIGHCOMP),
    0x0F,
    (APTR) &IText[3],
    NULL,
    'U'
},

{ /* MenuItem[4] : Possessions */
    &MenuItem[7],
    0, 0, 120, 9,
    (ITEMTEXT | ITEMENABLED | HIGHCOMP),
    NULL,
    (APTR) &IText[4],
    NULL,
    NULL,
    &MenuItem[5]
},

{ /* MenuItem[5] : subitem : Pockets */
    &MenuItem[6],
    110, 4, 90, 9,
    (ITEMTEXT | ITEMENABLED | HIGHCOMP),
    NULL,
    (APTR) &IText[5]
},

{ /* MenuItem[6] : subitem : Backpack */
    NULL,
    110, 13, 90, 9,
    (ITEMTEXT | ITEMENABLED | HIGHCOMP),
    NULL,
    (APTR) &IText[6]
},

    { /* MenuItem[7] : Personal */
        NULL,
        0, 9, 120, 9,
        (ITEMTEXT | ITEMENABLED | HIGHCOMP),
        NULL,
        (APTR) &IText[7],
        NULL,
        NULL,
        &MenuItem[8]
```

Listing continued on page 106

```
    },

    { /* MenuItem[8] : subitem : Health */
        &MenuItem[9],
        110, 4, 70, 9,
        (ITEMTEXT | ITEMENABLED | HIGHCOMP),
        NULL,
        (APTR) &IText[8]
    },

    { /* MenuItem[9] : subitem : Hits */
        NULL,
        110, 13, 70, 9,
        (ITEMTEXT | ITEMENABLED | HIGHCOMP),
        NULL,
        (APTR) &IText[9]
    },

    { /* MenuItem[10] : Heal */
        &MenuItem[11],
        0, 0, 80, 9,
        (ITEMTEXT | ITEMENABLED | HIGHCOMP),
        NULL,
        (APTR) &IText[10]
    },

    { /* MenuItem[11] : Light */
        NULL,
        0, 9, 80, 9,
        (ITEMTEXT | ITEMENABLED | HIGHCOMP),
        NULL,
        (APTR) &IText[11]
    }
};

/*
    These are the Menu Initializations.
*/

struct Menu Menu[] =
{
    { /* Menu[0] : Weapons */
        &Menu[1],
        0, 0, 80, 0,
        MENUENABLED,
        "Weapons ",
        &MenuItem[0]
    },

    { /* Menu[1] : Inventory */
        &Menu[2],
        100, 0, 100, 0,
        MENUENABLED,
        "Inventory ",
        &MenuItem[4]
    },

    { /* Menu[2] : Magicks */
        NULL,
        220, 0, 80, 0,
        MENUENABLED,
        "Magicks ",
        &MenuItem[10]
    }
};

/*
    This definition is included only to make this file compatible
    with the driver.  This section may be removed after testing
    of the menustrip is complete.
*/

struct Menu *MyMenu = &Menu[0];
```

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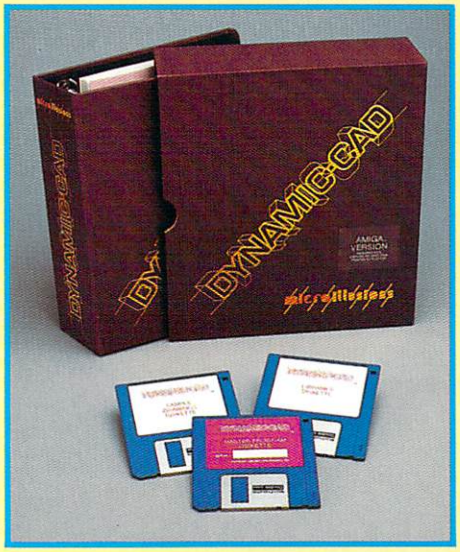
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- Supports hard disk systems
- DC is not copy protected
- DC supplies online help
- Screen resolutions of 640 x 400 and 640 x 200 modes
- Both keyboard and mouse functions
- Extensive symbol library
- Alphanumerics: left, right, center, horizontal, vertical, varied angle
- Multiple line possibilities with varied arcs and degrees
- Horizontal & verticle doglegs
- Automatic line dimensioning in U.S. standard, metric or neither Gives X Y coordinates
- Create own pseudo symbols
- Arcs and circles
- Editing commands to move, delete and search
- Enter, rotate, change size or delete pseudos
- Group functions to manipulate, delete, step and repeat, move, etc.
- Fill and cross hatch capabilities
- Zoom and move elements around, resizing and repositioning
- Creates automatic schematics
- Creates net lists from electronic drawing or schematic
- Parameter settings include window size, percent of viewing area, alphanumeric ratios, 8,192 level selections, adjustable grid sizes, third line showing, grid set and overlay, line snap, alpha size, off screen display
- Can capture pictures in IFF format

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